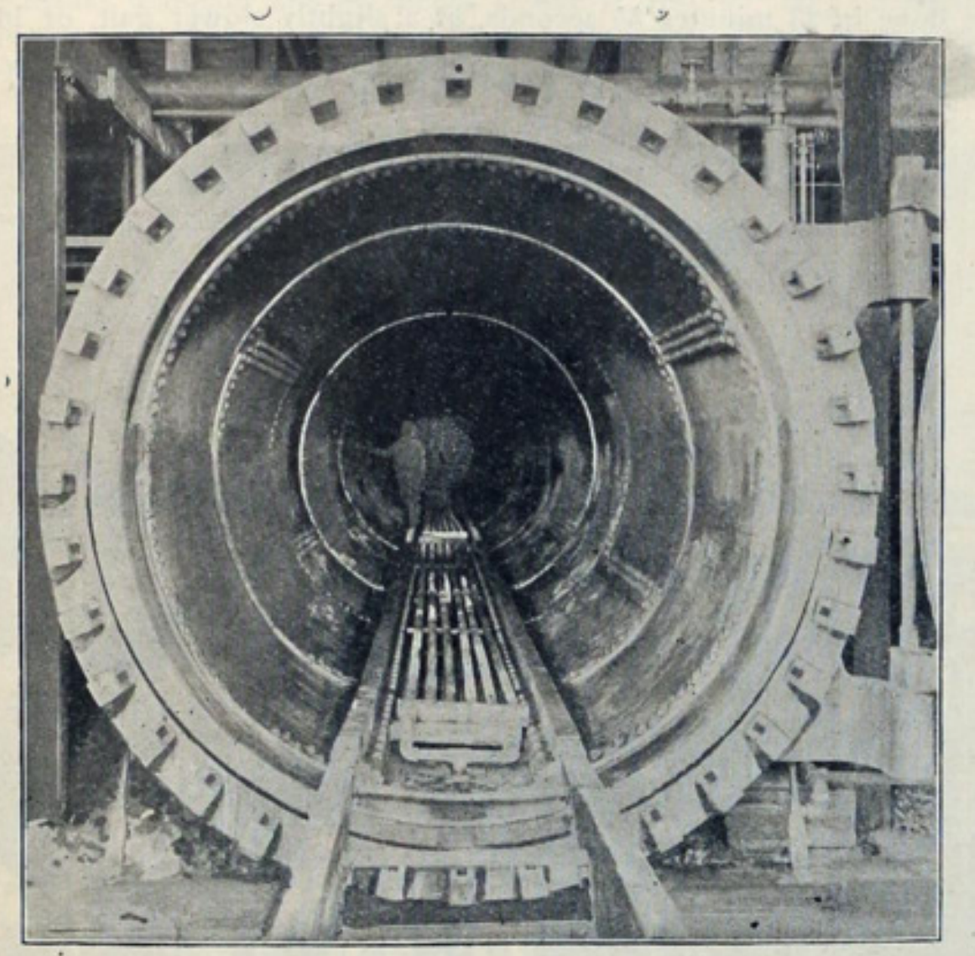
MARINE REVIEW

VOL. XX. Published every Thursday at 418-19 Perry-Payne Bldg., by the Marine Review Pub. Co. CLEVELAND, O., NOV. 30, 1899. Subscription $2.00 a year. Foreign $3.50 a year. No. 22

FIRE-PROOF WOOD FOR SHIPS.

AN INDUSTRY OF RECENT DEVELOPMENT BUT OF GREAT IMPORTANCE FROM A NAVAL STANDPOINT—DESCRIPTION OF ONE OF THE PLANTS AND PROCESS OF MANUFACTURE.

All the navies of the world, and the United States navy in particular, profiting first by the lesson of the Chinese-Japanese war and later by our war with Spain, have realized the absolute necessity for discontinuing the use of all combustible material in the construction and equipment of war vessels. The one special lesson of these wars to the naval architect has



INTERIOR OF DIGESTER, SHOWING TRACKS, ETC.

been the danger of destruction of the vessels by conflagration in action, and the most important step towards overcoming this danger has been the adoption of fire-proof wood wherever it is possible to use it. But the use of fire-proof wood is not alone confined to vessels of war. Underwriters are urging its adoption in large buildings, where structures absolutely fire-proof are desired, and with reduced costs, which will come later on, the use of this chemically-prepared material will undoubtedly extend to merchant ships which, with steel decks, steel deck houses, steel masts, etc., are gradually reducing to a minimum the materials that are liable to destruction by fire.

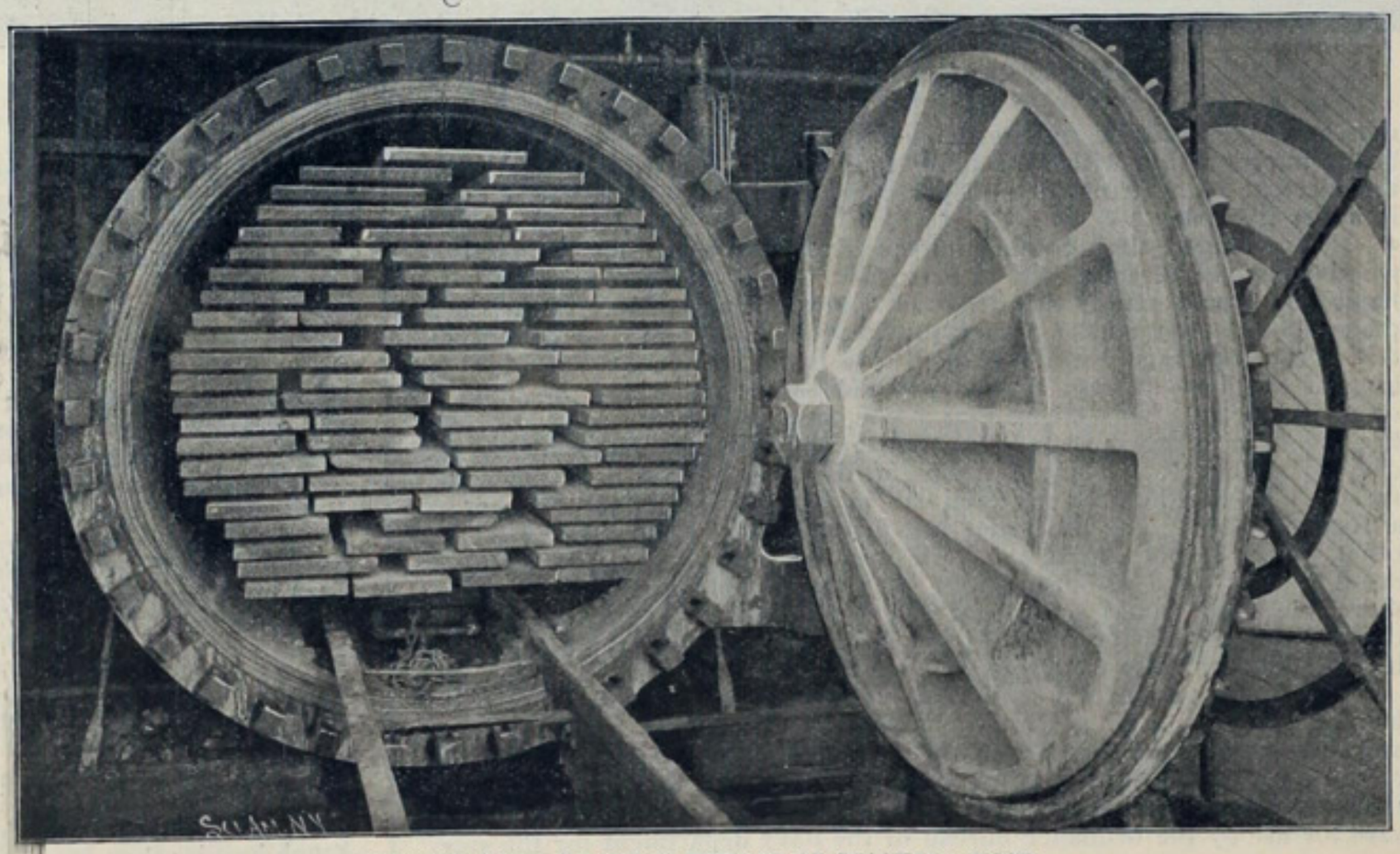
Methods adopted for fire-proofing wood are very interesting, but before entering into a detailed account of the process, it may be well to refer to the evidence of necessity for such material furnished by the battles of Manila and Santiago. Official reports on the battle of Santiago state that the Infanta Maria Teresa, Almirante Oquendo and Vizcaya were destroyed by conflagration, caused by explosion of shell in the interior, which set fire to the woodwork. The strongest evidence as to the importance of this question, and likewise illustrative of the intensity of the fire, and the rapidity with which it spreads, is given by the fact that on these vessels men were driven from loaded guns, not by projectiles, but by conflagration. That conflagration is more destructive than gun fire was likewise emphasized by examination of the Spanish vessels after the battle of Manila. But long before the Spanish war, and especially following the battle of the Yalu, the dangers of combustible material were realized in our own navy. The constant endeavor has been to reduce woodwork everywhere to a minimum, steel or some other non-combustible material being substituted wherever practicable, and where wood is used at all it is required to be subjected to approved fire-proofing processes. Even desks, chairs, tables, etc., now used on naval vessels are made of fire-proof wood.

Fire-proofing wood is in a measure like embalming; for the veins of the human being and of the wood are first relieved of their original sap and juices, and a preservative fluid injected. Fire-proofed wood, therefore, is not only proof against time, but it resists decay with great success, since the properties which permit fermentation, which induces dry rot, have been removed. Further, the wood is so thoroughly filled that when paint or oil is applied but comparatively little is needed. Tests have shown that fire-proofed wood is stronger in many instances, and in a few instances a trifle less strong, than it was originally.

DESCRIPTION OF THE NEWARK WORKS.

One of the plants in this country engaged in this line of work is at Newark, N. J., and is operated by the American Wood Fire-Proofing Co., which has principal offices in New York. At the Newark works is a large yard in which is laid a network of narrow gauge tracks, connecting with a spur of the Central Railroad of New Jersey, by means of which it may receive lumber to be treated, and materials for preparing the bath to which the wood is subjected The treated material may then be shipped by train or by boat, as the property has a frontage of 250 feet on the Passaic, where a large dock is now being built, which will take up most of the front. The plant consists essentially of three large digesters, which are built up of ¾-inch flanged steel, and guaranteed to a pressure of 400 pounds to the square inch. Two of these are 6 feet 8 inches in internal diameter, and 106 feet in length, and the third is of the same diameter and 32 feet in length. One end is permanently closed by a hemispherical head; the other end is provided with a massive cast steel hinged cover, 6 tons in weight, which is hung on a vertical hinge and may be swung to one side during the charging and emptying of the digester. It is provided with 36 heavy radial bolts, which engage the same number of sockets formed on the face of a cast steel flange on the digester. The locking bolts are of a rectangular cross-section and are cam-shaped at their outer ends, while at the center they abut against the inner side of a large plate washer. This washer is carried upon a massive screwbolt, which projects from the center of the cover, and is driven home against the cover by means of a massive threaded nut and handwheel. As the nut is screwed home, it presses the plate washer down upon the inner ends of the radial bolts, driving them into their several sockets and causing them to act with a cam-like effect to press the hinged cover to a snug bearing upon the face of the digester. A track formed of lengths of Z-iron runs the full length of the digester. A short piece of movable track is provided, by means of which these rails may be connected with the system of tracks which extends throughout the yard.

The wood which is to be treated is loaded upon small trucks until it conforms approximately to the curve and diameter of the cylinders, care being taken to observe a somewhat uniform spacing, in order to allow a free circulation for the chemical solution with which the wood is to be treated. The timber is then secured to the trucks by iron bands and the trucks are wheeled into the cylinders and clamped down securely to the track. The end doors are then packed with a rubber gasket, swung to, and securely clamped. Steam is now admitted at a pressure of 10 pounds and the whole charge is submitted to a steam bath, which penetrates the wood, softening and loosening the dried juices which have remained in its fiber. The length of time depends both upon the variety of the wood and its thickness, and it may be anywhere from one to fifty hours. After the steaming process is complete, a powerful vacuum pump is applied for a period of from three to fifteen hours, the vacuum as recorded by the gage being from 27½ to 28 inches. The immediate effect of the vacuum is to draw out of the cellular structure of the wood all of the saps, juices, etc., and leave it in a condition which might be described as that of an extremely finely divided honeycomb. When the vacuum treatment is complete, an alkaline solution is allowed to flow into the cylinders, great care being taken to prevent the entrance of any



DIGESTER OPEN, SHOWING METHOD OF STACKING WOOD.

air. As the solution rises in the cylinders it is absorbed by the cavities of the wood until the latter is nearly saturated. To assist the absorption, the pressure pump is started and the pressure is raised to 200 pounds, the pumping being maintained as long as there are any indications that the wood is absorbing the solution. The surplus is then pumped back from the cylinders to the storage tank, the doors are opened, and the wood is run out again to be stacked in the air for drying, or if so desired it is run directly into a drying kiln. In drying, the water evaporates and leaves all the inner walls of the cells covered with minute crystals of fire-proofing salts.

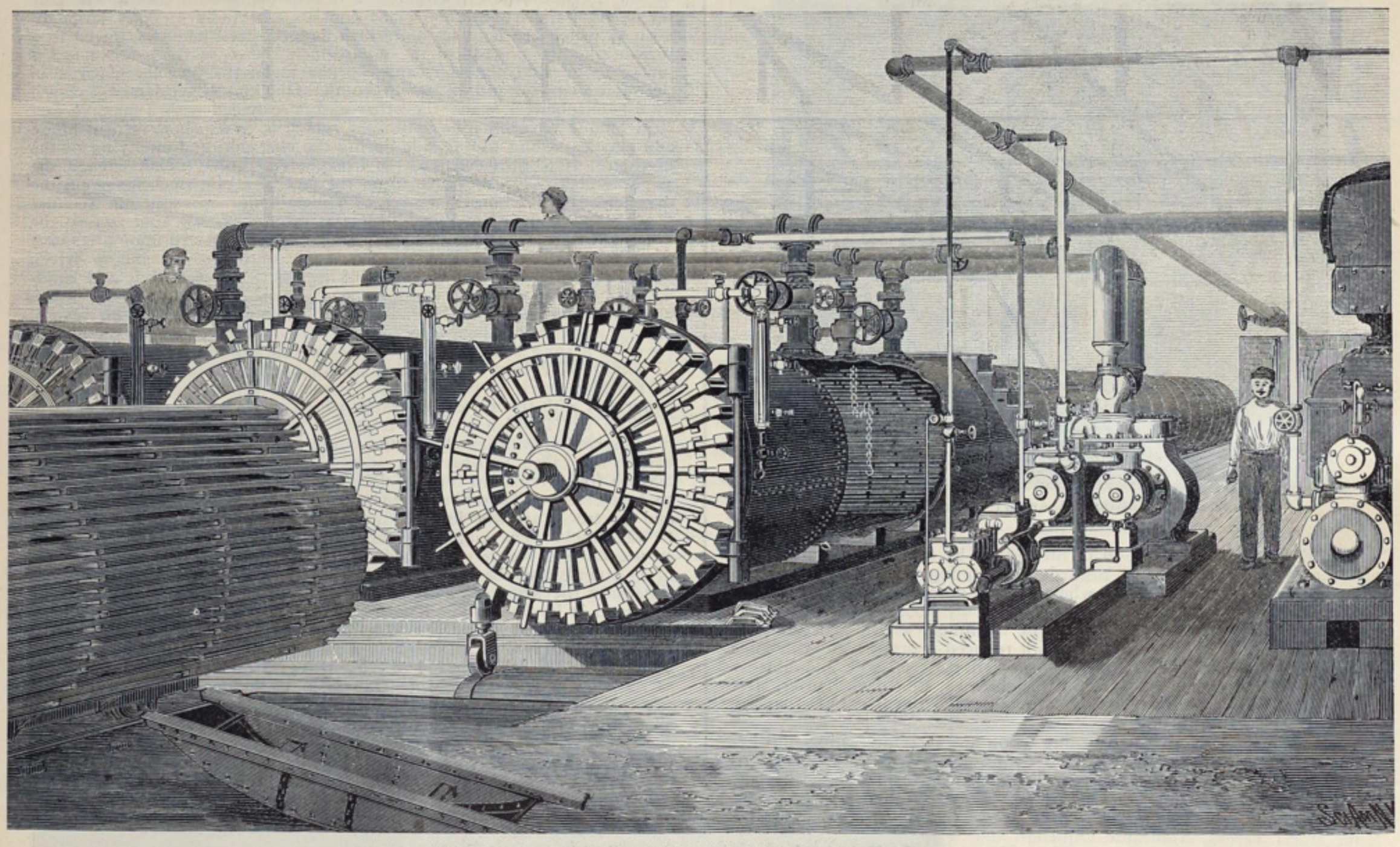
This completes the process, and the treated wood is to all appearances the same as before it went through the operation. It contains all of its original properties except that by withdrawing all that remained of the juices the wood has been relieved of that portion of it that would tend to set up fermentation. Hence, incidentally, the treatment is a preservative one, for it substitutes an antiseptic in place of material which is the direct cause of dry rot. The treatment also has the advantage that the wood is so thoroughly filled that when it comes to be painted very much less oil is required than would be necessary in the case of untreated wood. Moreover, the fire-proofed material is susceptible of a much higher polish even in the case of such soft woods as white pine and poplar.

Extensive tests of the treated timber have shown that the strength of the wood is slightly increased in some varieties, and slightly decreased in others, the average decrease of strength in all the varieties of timber that have been treated and tested being not over 5 per cent. Such a heavy impregnation with salts necessarily adds to the weight of timber, the increase being from 5 to 15 per cent, according to the variety that is under treatment.

The average citizen coming into possession of a piece of fire-proofed wood would be disappointed at first. He would put it in contact with flame and would expect that it would show no more effect of the heat than a stone. As a matter of fact, the fireproof wood will char, and if you take a thin shaving of it and subject it to flame you find it will glow so long as the flame is kept applied. Withdraw the flame and the glow at once disappears. This means that if you want to burn up a piece of the fire-proof wood you must keep the flame constantly applied, allowing the charred surface to fall away, when the flame will make a new charred surface. This is the only way you can burn the fire-proof wood made at a Newark plant. The heat does not penetrate the wood. The heat, in other words, is not cumulative. For instance, if you dropped a pan of red-hot coals on a fire-proof floor, and then went away and left them there, the coals would simply eat a hole through the floor and leave a charred rim around the hole. If the floor was of considerable thickness it is certain the coals would die out before the floor was eaten through.

The process as carried out at the Newark works and above described has been approved by a United States Naval Board as being equal to any submitted to the department for test. The company has recently received a contract from the government to supply the interior wood construction for a building which is now being erected at the Brooklyn navy yard for use by the ordnance bureau of the navy department for the storage of high explosives. The process has also been accepted by the civil engineering bureau for use in the new executive building at the same navy yard, and the General Electric Co. has now under treatment lumber to rebuild where fire recently damaged one of its buildings.

The New York offices of the American Wood Fire-Proofing Co. are in Bowling Green building. Officers are: President, Guy Phelps Dodge; vice president, J. S. H. Clark, of Newark; treasurer, George H. Clark, Jr., Newark; secretary and manager, A. Eugene Kirby; assistant manager, Samuel A. Clark, Newark.



PLANT OF AMERICAN WOOD FIRE-PROOFING CO. AT NEWARK, N. J.

TRIAL OF THE BATTLESHIP KENTUCKY.

The battleship Kentucky, recently completed by the Newport News Ship Building & Dry Dock Co., had her trial under almost ideal conditions over the Cape Ann course, off the Massachusetts coast, last week, and attained a speed of 16.867 knots. The Kentucky's record somewhat exceeds that made by her sister vessel, the Kearsarge, and it is expected that when the tidal allowance has been figured, a showing of fully 17 knots will be made. The Kentucky crossed the line at 10:27:37. She reached the battleship Texas, marking the end of the first leg at 10:51:23 with the elapsed time for the distance 23 minutes and 46 seconds, a 16.658-knot gait. The next leg, ending with the light-house tender Mayflower, was done in 23 minutes 55 seconds, at a slightly slower gait, or 16.551. The third leg was done in 23 minutes 26 seconds, a 16.91 clip. The fourth leg was still faster, the distance being done in 23 minutes 20 seconds, 16,979 knots. On the last leg the latter figure was exceeded, the distance being done in 23 minutes 13 seconds, or at a 17.01 rate. The total time for the outward trip was 1 hour 57 minutes and 41 seconds, with an average speed of 16.824 knots. After a wide turn the return trip was begun at 12:44:56. The elapsed times for the different legs with the speed in knots were: 23 minutes 14 seconds, 17.038 knots; 23 minutes 33 seconds, 16.89 knots; 23 minutes 22 seconds, 16,942 knots; 23 minutes. 49 seconds, 16.639 knots; 22 minutes 57 seconds, 17.254 knots. It will be seen that the highest and lowest rates were reached in the fourth and fifth legs on the inward trip. The entire inward trip was done in 1 hour 56 minutes and 56 seconds, with the average speed 16.932 knots. The time for the entire trip, 66 miles, was 3 hours 53 minutes and 30 seconds.

President Orcutt for the Newport News company said that the company was very well satisfied with the record, made as it was under a head wind. The engines worked beautifully, averaging in revolutions about 115 with a steam pressure ranging from 160 to 180 pounds. There was no noticeable vibration. Among the guests on the trial were Rear Admiral W. T. Sampson and Gov. Voorhees of New Jersey.

Thos. Drein & Son of Wilmington, Del., builders of life boats, life rafts, etc., append this note to a letter just received by the Review: "We are so busy that we must urge upon the ship builders of the lake region who use our beaded, steel-bottom life boats the necessity of sending in orders at the earliest possible moment, so that we may hurry work during the winter and be ready for them in the spring, as our eastern orders are much heavier than ever before."

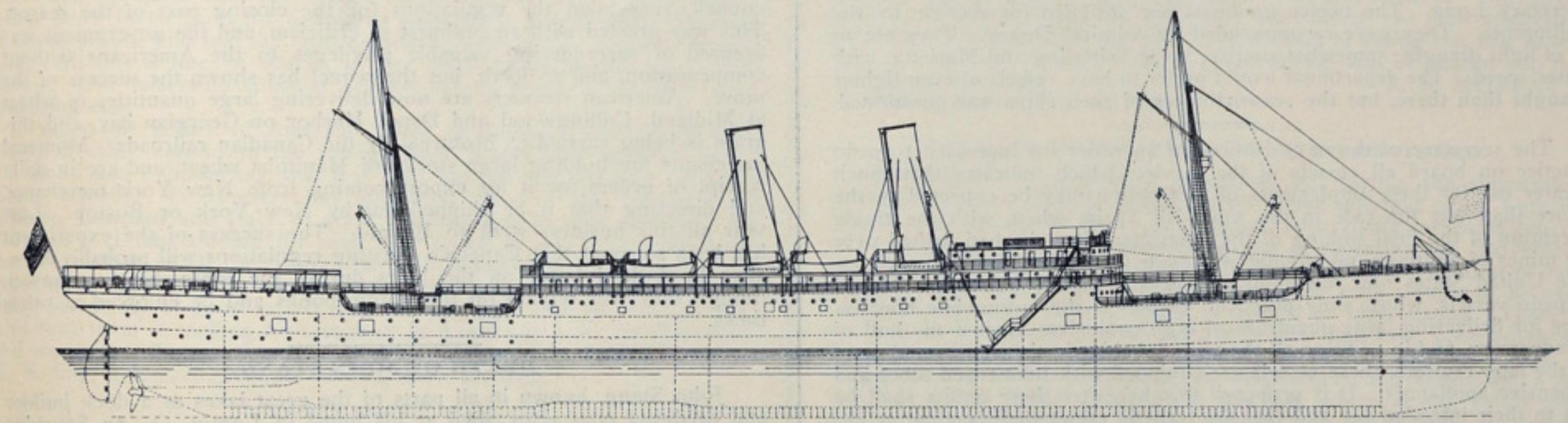
NEW PACIFIC MAIL SHIPS.

SHORT DESCRIPTION OF TWO BIG STEAMERS, THE LARGEST EVER BUILT IN AMERICA, TO BE CONSTRUCTED AT NEWPORT NEWS FOR PACIFIC SERVICE.

The Review presents herewith the first plan of the new Pacific Mail steamers as yet published. These two steamers will not only be the largest vessels of any kind ever constructed in America, but will be the largest vessels to fly the American flag in any service at any time. The keel of the first of the vessels was laid only a few weeks since at the works of the Newport News Ship Building & Dry Dock Co., Newport News, Va. It is understood, of course, that Mr. Collis P. Huntington, principal owner of the Newport News works, is also the leading spirit in the Pacific Mail Steamship Co.

Each of the new steamers will be 575 feet over all, 550 feet between perpendiculars, 63 feet molded beam and 40 feet depth. The displacement on a draught of 27 feet will be 18,400 tons, and the gross tonnage (measurement) 12,000 tons. Each vessel will have accommodations for 150 first-cabin and 1,200 steerage passengers.

These steamers are to be fitted each with two quadruple expansion engines of 18,000 indicated horse power. Cylinders will be of 35, 50, 70 and 100 inches diameter and 66 inches stroke of piston. The cylinders and sequence of cranks are arranged to give minimum vibration and the machinery is expected to give the vessels a speed of 18 knots. Steam will be supplied from six double and two single-ended boilers, all of the cylindrical Scotch type and each of 16 feet diameter, and built for a working steam pressure of 200 pounds. In addition there will be one donkey boiler of 11 feet 6 inches in diameter, also built for 200 pounds pressure.



OUTBOARD PLAN OF PACIFIC MAIL STEAMERS BUILDING AT NEWPORT NEWS—THE LARGEST VESSELS EVER CONSTRUCTED IN AMERICA.

All main boilers are fitted with hot, forced draft supplied by thirteen Sturtevant steam fans. The bunker capacity of each vessel will be 2,500 tons. The contract was placed early in 1899, but the great rush of work at the Newport News yard delayed the beginning of work on the vessels. Unless unforeseen obstacles are encountered delivery will be made some time the latter part of next year.

RUSSIA'S MERCHANT MARINE.

A most important measure that is expected to revolutionize the sea trade between Russian ports will go into effect on Jan. 1 next. The Russian coast trade has heretofore been free to the ships of all nations, but beginning next year no foreign vessels, excepting one small class, may engage in the trade between Russian ports. The far-reaching nature of this law will be understood when we consider that many thousands of miles separate the eastern from the western ports of Russia. Under this law, for example, shipments may be made between St. Petersburg and Odessa in the west and Talien-wan, China, and Vladivostock in the east only in Russian bottoms. The exception to the law permits foreign vessels to transport salt from the ports of the Black Sea and Sea of Azov to the Baltic ports.

About four-fifths of this trade has heretofore been in the hands of foreign shipping and due notice was given of the great change to be made in the carrying trade by the promulgation of the new measure in May, 1897, two years and seven months before the date fixed for its enforcement. The purpose of the law is to stimulate the growth of the Empire's commercial marine. The commission appointed in 1897 to investigate the question of Russia's ocean-carrying trade reported that the Empire was losing about $37,000,000 a year in freights paid to foreign vessels because of the inadequacy of Russia's shipping. The government pays an annual subsidy to the Black Sea Steamship Co., but has not favored similar payments to other lines. It believes, however, that the measure it has adopted will impart a large impetus to the Russian shipping interest, and while developing the home coasting trade will give the Russian merchant marine the training it needs for wider activity in the international markets.

At probably no time in the history of lake navigation has a year passed with less loss of life or property than has occurred during the season now drawing to a close. The underwriters are not out of the woods, as insurance on a large part of the fleet will not expire for several days yet and there will undoubtedly be some extensions of insurance that may be followed by losses, but with the advanced rates secured last spring and with the season now practically at an end, congratulations are certainly in order in insurance circles.

Large quantities of cannon balls and shells that were manufactured for use in the civil war and have been stored for years in the Brooklyn navy yard have been purchased by the Penn Iron Works Co. of Chester, Pa.

DRAINS ON WATER SUPPLY—ERIE CANAL POPULAR AGAIN.

Buffalo, Nov. 28.—I ran across a bit of heresy somewhere lately that ought to be nailed at once for what it is apparently worth. I thought I saw it in the Review, but afterwards failed to locate it there. It was an item written by some friend, whether he knows it or not, of the people who are trying to divert the waters of the lakes by means of systems of drainage and manufacturing and thus add to the burdens of the navigator, who is just beginning to feel the results of the efforts to deepen the inter-lake passages and is now no longer regularly "hung up" on Grosse point or some other shallow spot that used to keep every lake captain awake nights the season through.

Captains of long experience and good nerves have often told me that the well-known sound of their vessel scraping its keel on some obstruction would at any time make the cold sweat start out on them like the quills. This is not classic language, but it is of the kind needed to head off the quibblers who are telling us, as the article I refer to did, that something else than the drawing off of the water from the lakes by private schemers is responsible for the lowering of the levels. The article was sure that there was a new channed in St. Clair river, very deep, which was taking the water off and that there were likely other causes of the same sort that were, or would be, accountable for the absence of the water wanted by the vessels; therefore let the private enterprises alone to take what they wanted. They were of no consequence to navigation.

This is the worst of heresy, of course, though it has been used quite effectively, apparently, or the inroads already permitted by the government on the water supply would have been stopped before they began. It is safe to say that anything which carries off the water of a lake must reduce its level and that is the entire case. Vessel men estimate that every inch of draught is worth about 45 tons to a 400-foot vessel. Sometimes this inch is all the way between a good profit and loss that cannot be made good.

What would not the Canadians give for a foot more of draught than their canals will afford when they are finished? As they stand now they are pretty nearly useless. The traffic has so nearly ceased on the Welland-St. Lawrence route that it is of no account in the general calculation, and with the canals all 14 feet deep the advantage is not of much account. Buffalo does not need to regard it. In fact some things have developed within a few days that indicate that the diversion created by the Canadian canals, as agitated by the Conners syndicate, will be turned to the direct benefit of the Buffalo route, for it has stirred up the back counties, not only in Albany but in Washington as well, and Erie canal sentiment is to be had for the asking at every cross road.

Then the canal itself has taken a hand at vindicating itself this fall. When the grain began to pour in some weeks ago after its usual fall fashion, and it was found that the car supply was unusually short, all the timid vessel men said there would be the biggest grain blockade here that the lakes had ever seen. Then the grain somehow managed to get away from the roads and was turned over to the canal and at once the blockade, such as it was, began to disappear. The baby canal fleet at once showed its flexibility, something that is always out of the question in the car service. There are very few canal boats left but every one of them steered for Buffalo, and they carried off half a million bushels of grain in a day, instead of the half a dozen boat loads that was the rule when the roads were in possession of the situation. Well, the canal is popular with us again. It has done something, feeble as it has been allowed to become, and it is going to be built up and placed on a par with other carrying routes, and the commerce of New York, which the roads have been throwing away, will be saved.

JOHN CHAMBERLIN.

An excellent idea of the cost of maintenance of the naval establishment of the United States may be gained from the recently issued report of Rear Admiral A. S. Kenny, paymaster general of the navy and chief of the bureau of supplies and accounts. The total credits of the navy department, including the balance from the last fiscal year, were $141,617,251 and total debits $73,145,992, leaving a balance of appropriations on June 30, 1899, of $68,471,259. The amount drawn from the treasury was $64,194,255, including $6,754,974 for repairs to ships at home and abroad. The cost of maintaining ships in commission, including the pay of officers and men, incidental expenses and material was $13,983,174.

The navy department has invited bids for the purchase of the collier Scipio and the old naval tug Rocket. The Scipio, the appraised value of which is $25,000, was built in Scotland in 1882 and is not entitled to American registry. The Rocket was purchased by the government in 1863 and her appraised value is $600.

PROGRAM OF NAVAL INCREASE.

SECRETARY OF THE NAVY ADOPTS RECOMMENDATION OF BOARD OF CONSTRUCTION FOR THREE MORE ARMORED CRUISERS, THREE PROTECTED CRUISERS AND TWELVE GUNBOATS—MORE PRACTICE WITH TORPEDOES—WASHINGTON MATTERS.

WASHINGTON OFFICE MARINE REVIEW, 1345 PENNSYLVANIA AVE.
WASHINGTON, D. C., NOV. 29, 1899.

The secretary of the navy has adopted with some slight changes as to the tonnage of the vessels concerned the program of naval increase recommended by the board of construction, and in his annual report to the president will advocate the construction of the following vessels, congress being asked to appropriate the necessary amount for use during the fiscal year beginning July 1, 1900: Three armored cruisers of about 13,000 tons displacement each; three protected cruisers of about 8,000 tons displacement each, and twelve gunboats of about 900 tons displacement each.

The program adopted by the board of construction which served as the basis of the secretary's recommendation, provided for three armored cruisers of about 13,500 tons each, three protected cruisers of about 8,000 tons each, six gunboats of about 1,000 tons each and six gunboats of about 800 tons each. The only changes made by the secretary are in paring down the tonnage of the armored cruisers and consolidating the gunboats in one class, splitting the difference of the tonnage recommended by the board. Much doubt was expressed in naval circles that the department would decide to recommend any armored ships. It was generally believed that in view of the fact that the department had to include armor clads in its suggestive program to the board of construction, the board's recommendations as to armored vessels would be rejected by Secretary Long. The twelve gunboats are designed for service in the Philippines. They were recommended by Admiral Dewey. They are to be of light draught, somewhat similar to the Wheeling and Marietta, with better speed. The department would prefer to have vessels of even lighter draught than these, but the seaworthiness of such ships was questioned.

The secretary of the navy has issued an order for increased torpedo practice on board all vessels of the service, which indicates that much greater use for these implements of destruction may be expected in the future than was the case in the war with Spain, when, with the single exception of the final sinking of the Merrimac after she had drifted over the mines of Santiago, no attempt was made to use automobile torpedoes. The United States now maintains a large and rapidly increasing fleet of torpedo vessels, whose only practical weapon is the automobile contrivance for delivering large quantities of high explosives against the hull of an adversary, and in addition all the armored ships in the service and most of the later cruisers, these vessels are equipped with submerged tubes and expensive appliances. It is proposed that hereafter these outfits shall be put to their intended use and that the torpedo crews shall become as expert as the gun crews showed themselves to be a year and a half ago. Occasionally there have been fitful practice drills with torpedoes aboard ship, but only at fixed targets. Now the course at the naval station at Newport is to be supplemented on cruising ships at least once a quarter and monthly on torpedo boats with the important innovation of moving targets. The new order which goes into operation at once is as follows:

"The commanding officer of every vessel other than a torpedo vessel shall cause each torpedo on board the vessel under his command to be run at least once in each quarter, and in case of failure to carry out the provisions of this paragraph a quarterly torpedo practice report made on the regular torpedo practice form must state the reasons of the failure. Torpedo practice, additional to the above, for the instruction of the officers and men shall be held as much oftener as circumstances may permit, and the commander-in-chief, senior officer present or commanding officer may deem advisable.

"Torpedo practice with the vessel dead in the water is of value only so far as the care and adjustment of the torpedoes and the training of inexperienced crews are concerned, and the commander-in-chief, senior officer present or commanding officer will therefore use every effort to hold torpedo practice at the highest practicable speed and when possible at a moving target. Every precaution must be taken to insure the recovery of a torpedo when fired for an exercise run, but it is not desired that the fear of the loss of an occasional torpedo shall prevent officers and men from becoming thoroughly familiar with the weapon under probable service conditions of speed and helm angle of ship and air pressure in torpedo flask.

"The provision of the foregoing paragraphs of this order shall apply to torpedo vessels, except that on board such vessels each torpedo must be fired at least once a month and the reasons for every failure to so fire them shall be stated in the quarterly torpedo report.

"The commanders-in-chief and senior officers present will take steps to insure the carrying out of the provisions of this order."

Secretary Long is now considering whether he shall recommend in his annual report that legislation be enacted authorizing the consolidation of the bureaus of construction and repair, steam engineering and equipment. He has turned his thoughts in this direction, owing to the evidences of friction which obtain in these departments. That each should encroach upon the domain of the other is almost unavoidable. Each department wants all the space it can get upon a ship. None of the chiefs of bureaus is in favor of the plan, though Constructor Hichborn is less opposed to it than the others.

The navy department expects to receive shortly from the Holland Torpedo Boat Co. a proposition looking to the removal of the machinery now on board the submarine boat Plunger and the installation of new machinery in its stead. A board was recently convened by the department to pass upon the efficiency of the Plunger's machinery but the company requested permission to make changes and the department has approved the request.

The navy department has accepted preliminarily the torpedo boat Dahlgren, built by the Bath Iron Works, upon the report of the naval board of inspection that the boat made 30.007 knots per hour and was sound in every particular. It has been recommended that a penalty of $4,925 be exacted for failure to make 30.5 knots, as promised by the builders in the supplemental contract.

CANADA'S FIGHT FOR THE GRAIN TRADE.

Notwithstanding the complaint set up by Canadian vessel owners as a result of the recent action of the Dominion government in suspending the coasting regulations on the great lakes, which prevented American vessels carrying grain between Canadian ports, it is a fact that this move has resulted in Canada securing a great deal of business that would otherwise have gone to Buffalo or other ports in the United States. This is admitted by the grain merchants of Montreal even within the few weeks that have elapsed since the government order was issued. The coasting laws of Canada are similar to those of the United States; they keep the coasting trade of the country exclusively for the native ships. But, though this has been the law in Canada for years it has not had its expected effect of building up a lake marine. The Canadian tonnage on the lakes, amounting to practically nothing as compared with the great fleet of American vessels, has steadily decreased in the last dozen years, and of late years the only effect of the coasting laws has been to deflect the Canadian wheat trade from Canadian ports to Buffalo, especially towards the close of navigation when grain shipments are very active. There not being enough Canadian vessels to transport the wheat, American steamers had to be called in, and, as they could not carry it to a port on the Canadian side of the lakes, they had, perforce, to go to Buffalo. This year the government, by order in council, suspended the regulations for the closing part of the season. This was greeted with an outburst of criticism, and the government was accused of surrendering valuable privileges to the Americans without compensation, and so forth, but the sequel has shown the success of the move. American steamers are now delivering large quantities of wheat at Midland, Collingwood and Depot Harbor on Georgian bay, and this grain is being carried to Montreal by the Canadian railroads. Montreal merchants are holding large stocks of Manitoba wheat, and are in daily receipt of orders for it for export coming from New York merchants, and directing that it be shipped out by New York or Boston. Last year all this business went to Buffalo. The success of the experiment has been so great that Canada's coasting regulations will probably hereafter be a dead letter on the lakes during the grain-shipping season, though they will remain on the statute books and be enforced at other times.

DEATH OF JOHN STANG.

John Stang, known in all parts of the great lakes as a dock builder and dredging contractor, died at his home in Lorain, O., on Saturday last after an illness of several months. Forty-five years ago John Stang, who was then a boy of nineteen, only a short time here from Germany, walked from Cleveland to Lorain, with probably not more than a dollar to his name, to join relatives on a farm. He worked at ship carpentering in winter and soon picked up enough of the trade to undertake small contracts in the ship yards. His contracts were extended to railroad work, to dock building and to the dredging of rivers and harbors for the government. He became interested in numerous enterprises in and around Lorain and for many years before his death was one of the foremost citizens of that place. He was highly respected. It was said that almost every child in the county knew him. All the merchants of the town closed their places of business at the funeral time. Colors of the ships in port were lowered. The local commercial body paid tribute to his character in a series of resolutions, and the courts of the county were closed. In the community where practically his entire life was spent and where everybody knew him all the people honored his memory. His business dealings extending beyond the town of Lorain were always of an upright kind.

WAUKEGAN COAL DOCKS.

The management of the Western Coal & Dock Co., which has been handling a large amount of coal at Waukegan, Ill., during the past season, is not of a kind that allows its business to suffer on account of the slow methods of government or municipal officials. The coal company had secured 19 feet of water in a slip where its unloading machinery is located, and the harbor channel in all its parts up to this slip should have been of full 16 feet depth, but a very large rock, which the city was expected to remove, was a decided menace to navigation. The city was slow to undertake the work and so the coal company caused the rock to be blasted and removed and paid for the work. Now they have 16 feet of water up to their slip with 19 feet in the slip, and they have undertaken important additions to their unloading plant, that are to be completed before the opening of navigation next season and which will result in practically doubling the capacity of the dock property, so that about 200,000 tons of coal, hard and soft, will be handled at Waukegan next year.

The late William H. Webb, ship builder, provided liberally in his will for Webb's Academy and Home for Ship Builders, which he founded. He gave directly to the institution the oil painting showing Robert Fulton explaining to Chancellor Livingston the first steamboat, his bust and all paintings, engravings or prints descriptive of marine vessels or their parts, plans, drawings and models of marine vessels and all memoranda pertaining to the science and art of ship building or kindred subjects. Upon the termination of the many trusts made and the death of his wife, Mr. Webb's fortune, which is now estimated at $600,000, will go mainly to Webb's Academy and Home for Ship Builders.

Wm. Rogers of Bath, Me., is to build two schooners with a carrying capacity of 1,800 tons each.

FOREIGN TRADE MERCHANT MARINE.

FINAL CONTRIBUTIONS TO THE PAMPHLET ON THIS SUBJECT THAT IS TO BE SUBMITTED TO CONGRESS—STRONG LETTER FROM THE CAPTAIN OF THE STEAMER CITY OF EVERETT.

Editor Marine Review:—Let me say first for myself and other masters, in answer to your questions regarding our merchant marine in the foreign trade, that we are in full sympathy with you and thank you for your endeavor to right a wrong of long standing. To one like myself, who has been back to the coast only a short while from a long foreign voyage, it is a God-send to hear that at least there is some one at home who sees the necessity of coming to the aid of American ships in foreign trade, as without this aid in my opinion this industry is doomed.

I left San Francisco June 12, 1897, on my last foreign voyage in charge of the whaleback steamer City of Everett, bound to Calcutta and chartered by the United States government to take a cargo of cereal for the relief of the famine-stricken district in India. The disappearance of the American ship in these waters was complete and certainly a shock to my feelings. I had formerly traded in the China sea and the finest clippers in that vicinity then were flying the American flag. During the long voyage to Calcutta I called at Manila and Singapore; later I called at Madras and Colombo, and at all these places I was assured by reliable men that the City of Everett was the first American merchant steamer that had ever been in those parts. At Calcutta the last American sailing ship had sailed out three years before my arrival. During my voyage (seven months) I saw one American barque. This was in Manila harbor where we called for fuel and water. I was repeatedly told by both Britons and Spaniards that the United States had no ships and no sailors (they know better now, the Spaniards especially), and in many instances I found people who had the most erroneous ideas of this country's standing. All this is due, of course, to our poor representation away from home. Our miserable consular service has as much to do with it as anything else.

When the failure of American ships to compete successfully with ships of other nations in the foreign trade is not only apparent but a foregone fact, I should say, tnat it is time, even at this late hour, to apply some remedy. If congress has authority, alike to the legislators of France, Germany and Italy, to grant remuneration to ship owners in the form of a certain amount for each mile sailed, it would certainly seem for the welfare of all the people that such means should be adopted, at least until our merchant marine again attains its former standard. We have yet plenty of good sailors who can compete with any foreign salts and beat them in making a passage or in doing any work on shipboard. All we want is the vessels. L. LAVERGE.

S. S. City of Everett, Newport News, Nov. 23, 1899.

FROM THE PACIFIC COAST.

Editor Marine Review:—All are agreed that our ocean merchant marine is not what it used to be, nor what we desire it to be. The average American is prone to be sentimental, and desires to see "Old Glory" at the mast-head. He may swap compliments and theoretically fall upon the neck of his English cousin, but when it becomes a matter of business, like his worthy relatives, he desires at heart a fair division of the ocean carrying trade, which is now largely in the hands of Englishmen and Germans. The causes of existing conditions are so many and so complicated that the average business man has little time, when not directly concerned, to look into them; so the subject has had treatment largely, yes almost wholly, by theorists. One cause of the steady decline in our ocean merchant marine, it seems to me, results from our effete navigation laws. While we had ample hardwood timber and supplied foreign nations with ships and ship building material, we had the winning card, especially as our laws prevented a foreign ship from coming under our flag, unless by special act of congress—unlike other nations, who admit our ships to foreign register, some with and some without duty.

Until the advent of iron ship building in foreign countries, this particular exclusion law as applied to foreign ships, worked to America's advantage. When foreign countries got the iron ship building to a point (which they still maintain) of producing cheaper ships, we were at once at a disadvantage and have remained in the same dilemma ever since. I am aware that it has been claimed by some people of late that ships can be built as cheaply in this country as elsewhere. One ship builder has repeatedly made that statement to that effect. Another builder, in private conversation, says: "All talk of that kind is pure bluff. Ships generally cannot be constructed in the United States as cheaply as in England, Germany or France." At present rates of wages and high prices for material further argument on that score, for the present at least, would seem superfluous. But admitting this to be a fact, now that there is an unusual demand for new tonnage in the coasting trade, more than our ship yards can supply in two years, why not enact a law permitting our citizens to bring in the ships they own under foreign flags, provided they pay a liberal duty for the privilege, or in other ways make up for it. Machinery and material that goes into the construction of a ship can come into the country on payment of duty, and much of it without paying anything. Almost, if not every conceivable foreign manufactured article, can be brought into the country and under American ownership, excepting a ship. This is not altogether the regulation argument of the leading supporters of shipping legislation but it should be given consideration.

The navy of our country should be the back bone of our ocean marine, and this statement prompts reference to another reason why our shipping has not for thirty years come up to our desires. No man, young or old (unless in time of war), no matter what his education, experience or ability may be, can rise in the navy, higher than a petty or possibly warrant officer. All commissioned officers must be Annapolis graduates. Many men in the merchant and naval service are fully as capable and worthy as those from Annapolis, but merit or experience cuts no figure. This nation has more coast line than any other country, to say nothing of our interior water ways. Geographically we are, or should be, a nautical people. For forty years past many thousands of our young men, naturally preferring a seafaring life, would have gladly gone into the navy had there been a future for them in the line of promotion, and just recognition of ability, which is often beyond that attained by graduates of the government school. If we are to ever have an A1 navy, it would seem we must return to revolutionary ideas, not only desiring, but accepting the best possible material obtainable, regardless of how, when or where experience, education, and ability were attained. There is more "caste" in our naval affairs than in pagan India or heathen China. The laws in force allow civilians to direct the forces of the navy, and yet a Roosevelt, a Long, or any other man of ability, notwithstanding the fact that he could pass a successful examination, under the present rule never can become the master of the smallest government tender or gunboat. What the plain people of the United States desire and demand is results such as Dewey gave us, not squabble, as witnessed on the Atlantic side. The people desire the navy built up and not the individuals.

It is plainly evident that in furtherance of the commercial interests of our country we should have substantial relief from congress. First, by the enactment of laws fostering American ship building, and providing for the transfer of foreign bottoms to our own flag on the payment of duty; second, the speedy construction of the Nicaragua canal; third, the allowance of bounty to American shipping; fourth, equal opportunity to the bright and capable young men of the country in our navy. Some of these suggestions are in the nature of a compromise and sacrifice of individual interests, but all business and politics is conducted upon the compromise principle, and if our object, the revival of our merchant marine and foreign commerce, is ever to become an accomplished fact, it must be in a departure from the many different and diverging ideas of the past, which have resulted in nothing but national chagrin. It would seem that there is no principle involved save that of self preservation. The earlier congress takes up this matter and enacts laws along the line suggested, the sooner the longed-for opportunity will come of seeing our flag in foreign seas, and our foreign trade, now increasing, will be pushed still farther into other lands. A. N. MOFFAT.

San Francisco, Nov. 15, 1899.

BACKING SIGNAL FROM PILOT TO ENGINEER.

Just before the opening of navigation last spring, the shipmasters of the great lakes, in their organizations in the different cities, were informed very plainly by James A. Dumont, supervising inspector-general of steam vessels, that the universal custom of repeating the two-whistle backing signal when it is desired to back strong is in violation of law, and that one long whistle or four bells are the only signals to be used when the engine is backing and it is desired to back strong. There is no need of going into any of the arguments that have been advanced for and against this ruling, as the purpose of reference to it now is simply to direct the attention of the shipmasters and engineers to the fact that if they desire a change in this law, which is still being generally violated on account of the custom that has sprung up among them, they must take the matter up immediately upon leaving their ships during the coming month. Last spring, when Mr. H. Coulby of Cleveland, representing some twenty-five steamers operated by Pickands, Mather & Co., had considerable correspondence on this subject with Gen. Dumont, he found that although he might have every master and engineer on the lakes back of him in trying to secure a change of the law, he could not do so, as it is a matter to be dealt with by the supervising inspectors, who meet but once a year. The meeting of the supervising board will occur in January, and if the backing signal is to be changed it will be necessary for the officers of lake vessels to take the subject up at once.

THE HARLEM'S DAMAGES,

A vessel owner who has kept close watch of the wrecked steamer Harlem since she was released from the rocks of Isle Royale, Lake Superior, says:

"The price asked by Messrs. Boynton and Thompson for the steamer, just as she is without repairs, is $170,000. The estimate for rebuilding her without an additional 72 feet added to her length is $106,000. Of this, probably the bottom would use up $87,000. The boilers will have to be retubed. She will have to be be repiped but her engine is practically uninjured. It is probable that the stern pipe may be broken, as the stern post is badly twisted and it shows in the shaft on the inside. She will practically have to be cut in two lengthwise for repairs. There are twenty-six plates above the water line that will have to come off, so that it may be said the amount given for her repairs is not too high. Her present owners figure that she stands them about $60,000, including the payment of $30,000 to the insurance companies. Seventy-two feet added to her would cost $750 a foot. These general estimates may be taken for what they are worth. Boynton & Thompson refused $120,000 for the steamer before she was put in dock. After she was in the dock this offer was withdrawn. The Harlem cost $275,000 when new. She is ten years old and the price asked for her today is at the rate of $71 per ton. She should earn from $56,000 to $60,000 next year providing rates keep up."

COALING VESSELS AT SEA.

Following is a dispatch from New York relative to trials of the Miller apparatus for coaling war vessels at sea, which was illustrated and described in the last issue of the Review, and which is manufactured by the Lidgerwood company of New York: "As a result of three days' trial of 'coaling a ship' while towing at sea, just completed by the United States battleship Massachusetts and the collier Marcellus, it may soon be possible for any warship to receive coal by the overhead wire system at an average rate of twenty tons an hour. The vessels named returned to port Monday and anchored off Tompkinsville, S. I., after having been away for a week, three days of which were spent at sea giving the conveyor a thorough trial under varied conditions. At the conclusion of today's trial—the third of the series—when 126 bags of coal, each weighing 410 pounds, had been transported in sixty-six minutes without accident, eighty-eight of them being delivered in forty-four minutes, the trial board announced that the test was ended and that it was satisfied with the result."

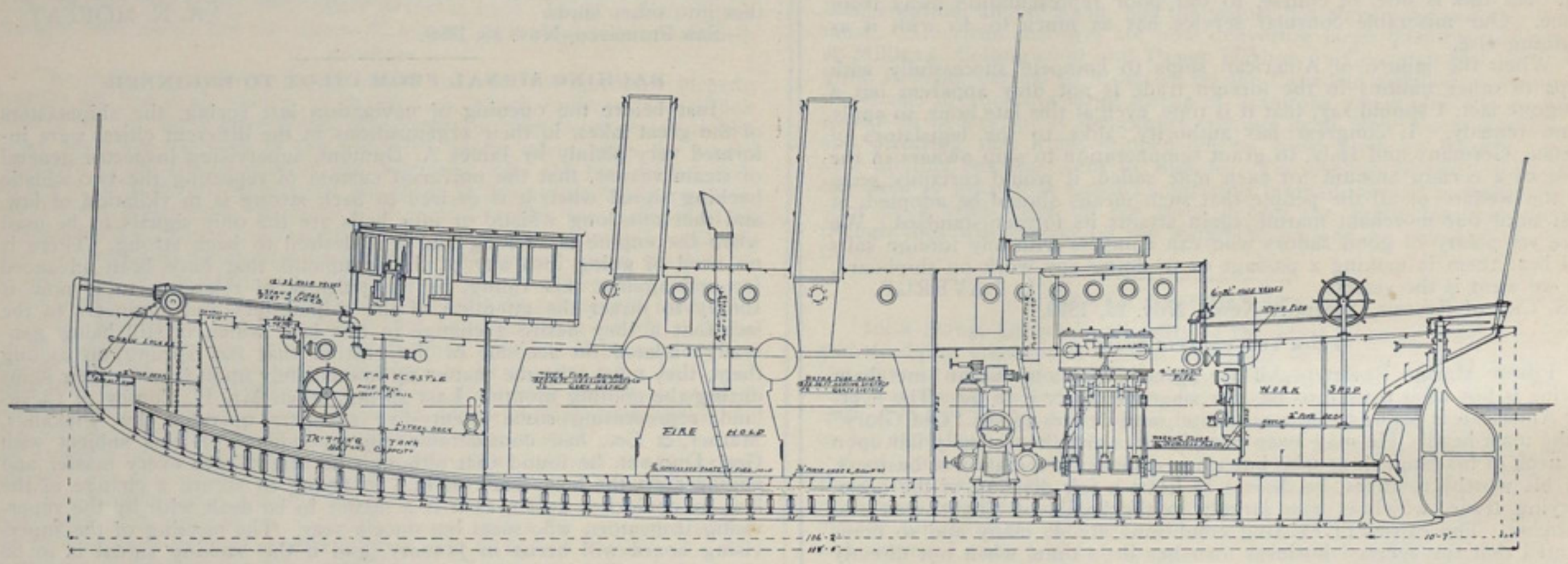
NEW BUFFALO FIRE BOAT.

THE HANDSOME STEEL CRAFT FOR WHICH A CONTRACT HAS JUST BEEN LET TO THE UNION DRY DOCK CO. OF BUFFALO.

The general plan and midship section herewith reproduced give a very good idea of the new fire boat for the city of Buffalo, for the construction of which the Union Dry Dock Co. of Buffalo, as the lowest bidder, recently received the contract at a figure slightly in excess of $90,000. This bid was some $16,000 in excess of the appropriation for the vessel, but the shortage was speedily provided and the work of construction will go forward at once. Some of the best fire fighting craft afloat are to be found in cities on the great lakes, and the new Buffalo vessel bids fair to rank with the finest of them. She will be built entirely of steel, without any woodwork whatever except for fenders and a little finishing inside the pilot house.

The vessel will be 118 feet in length over all, 106 feet 2 inches length between perpendiculars, 24 feet molded beam and 12 feet 10 inches molded depth. She will be fitted with a double, high-pressure engine with cylinders of 20 inches diameter and 22 inches stroke, built for a working pressure of 140 pounds of steam per square inch. The pumps are to be three in number with steam cylinders 17 by 11 inches and water cylinders 10 inches in diameter and 11 inches stroke. Steam will be supplied from two Babcock & Wilcox water tube boilers having a total heating surface of 3,700 square feet and a total grate surface of 112 square feet, built for 300 pounds of steam and with safety valve set at 225 pounds of steam, all to be according to the best practice of the Babcock & Wilcox Co.

The hull is to be of steel with steel houses and everything in the way of equipment of the best quality. In addition to the usual plating, or skin covering the frames, there is to be a heavy water line belt of ¾ inch in thickness worked all round the vessel at the water line, for the further protection of the boat against the heavy ice, which is common in Buffalo harbor. This is in accordance with the experience of the fire commissioners with the George R. Potter, another fire boat, which since being strengthened in this manner has been of much more service as an ice breaker with no expense for repairs.



INBOARD PLAN OF THE NEW BUFFALO FIREBOAT, BUILDING BY THE UNION DRY DOCK CO., BUFFALO, N. Y.

TRIAL OF THE VIPER.

The torpedo boat destroyer Viper, successor of the Turbinia as an exponent of the practicability of the Parsons steam turbine for purposes of marine propulsion, appears to have met all the expectations of its builders, the Parsons Steam Turbine Co. of Wallsend-on-Tyne, England. A trial of the boat was made a few days ago in a rough sea. The first reports reaching this country were to the effect that the boat attained a speed of 37 knots (about 42 miles) but this is seemingly incorrect, as an official statement published later is to the effect that the vessel made 32 knots with three quarters of her power and that "35 or 37 knots are expected from the utilization of full power." The Viper is 215 feet in length, 21 feet beam, 12 feet depth and of 320 tons displacement. She is fitted with engines capable of developing between 10,000 and 12,000 horse power and was guaranteed to make 30 knots. Revolutions of screws are estimated at 1,000 per minute. The Viper has four shafts with two screws to each shaft, and the turbine engines are so arranged that the vessel may go backward at a rate of 15 knots with four screws working. It is understood that as a result of the showing made on this trial Mr. Parsons, the designer, has decided to decrease the diameter of the screws and vary the pitch. He believes that by so doing it will be possible to secure additional speed.

The Marconi Wireless Telegraph Co. which was recently incorporated by Clement A. Griscom and others with an authorized capital of $10,000,000 will give special attention to the manufacture of instruments to be used for telegraphing between vessels at sea. Active operations are to be commenced at once, and the manufactory will probably be located in the vicinity of New York city. The company will early make an effort to equip with wireless telegraph instruments the signal and life saving stations along the coast, so that approaching vessels may be warned when fog and storm hide them and their lights.

COALING STATIONS FOR THE NAVY.

KEYNOTE OF REAR-ADMIRAL BRADFORD'S REPORT—DIFFICULTIES ENCOUNTERED DURING THE WAR WITH SPAIN.

WASHINGTON BUREAU, MARINE REVIEW, 1345 PENNSYLVANIA AVENUE, WASHINGTON, D. C., NOVEMBER 27, 1899.

Rear Admiral Bradford, chief of the bureau of equipment, has just submitted his annual report to the secretary of the navy. Its keynote is a plea for more and better coaling stations. He relates the difficulties encountered during the war with Spain in securing coal, transporting it and getting it aboard the ships. While these efforts were successful, the admiral says it was due almost entirely to the proximity of the theater of war to our own coast. Should a United States fleet have to act across the water it would have to encounter more difficulties than those encountered by Admiral Cervera.

"As a matter of fact," says Admiral Bradford, "it may be stated without fear of contradiction that at present it would be impossible for a United States fleet to carry on active operations during a war anywhere along the coast of Europe, Africa, a large portion of Asia and South America for want of coal. Not only was there a great drain on the stores and appliances supplied by the bureau during the war, but numerous and extensive repairs to all ships were necessary after its close. Repairs to 157 different ships were made during the war.

"A total of 281,169 tons of coal, costing $1,679,510.55, or an average of $5.97 per ton, was purchased during the last fiscal year, as against 452,551 tons costing $2,122,005.28, an average of $4.68 per ton, during the fiscal year ended June 3, 1898. Of this amount 85,953 tons were purchased abroad, costing $441,155.15 at an average of $5.13 per ton, as against 74,111 tons, costing $601,885.53, at an average of $8.12 per ton, during the previous fiscal year. There were purchased at home during the fiscal year 195,216 tons of coal costing $1,238,355.40 at an average of $6.34 per ton, as against 378,437 tons costing $1,520,119.75, or at an average of $4.02 per ton during the previous year. The increased cost is explained that during the fiscal year of 1898 the greater part of the coal was transported by government colliers and was therefore on no cost to the bureau. During the past fiscal year but very little coal has been transported in this manner and the bureau has been obliged to charter ships for this purpose. Large amounts of coal have been forwarded to Manila and Honolulu from the Atlantic coast. The consumption at Manila is about 4,000 tons per month. The increased average cost of coal purchased during the fiscal year is due to a larger percentage of coal consumed at distant points where its cost is much greater than at or near home ports. During the year 55,789 tons of coal were shipped to Manila at an average cost of $8.84 per ton and 12,000 to Honolulu at $8.42 per ton.

"In the opinion of the bureau the best coal is the cheapest. It is not alone a question of knots a ship can make per ton of coal; the preservation of boilers, freedom from spontaneous combustion and the endurance of the fire room force are all to be considered in selecting the kind of coal to be used. The quality of coal cannot be determined by inspection—that is to say it may be apparent that it is bad and it may be bad without being apparent." According to Admiral Bradford the only safe method to insure a supply of really good coal is to deal with firms of high repute.

In a chapter advocating the establishment of coaling stations Admiral Bradford says: "At the breaking out of the Spanish-American war in 1898 there was but one foreign coal depot, viz., Honolulu, Hawaiian islands. Here the government possessed one dilapidated shed on rented ground with a capacity for 1,000 tons of coal. Efforts were made when it was foreseen that war was inevitable to procure coal depots in the West Indies. In this the bureau failed, and the only remaining source was to supply the fleet with coal by means of steam colliers. Reference was made by the bureau in its report of last year to the success of this method. It was due almost entirely to the proximity of the theater of war to our own coast, where supplies of coal could be obtained in the absence of Spanish cruisers and to the early capture and control of certain ports in Cuba.

"In the Philippines success was also due to the immediate capture of the port of Manila for use as a naval base and to the fact that ships carrying supplies of coal to this port were not molested by the Spanish navy.

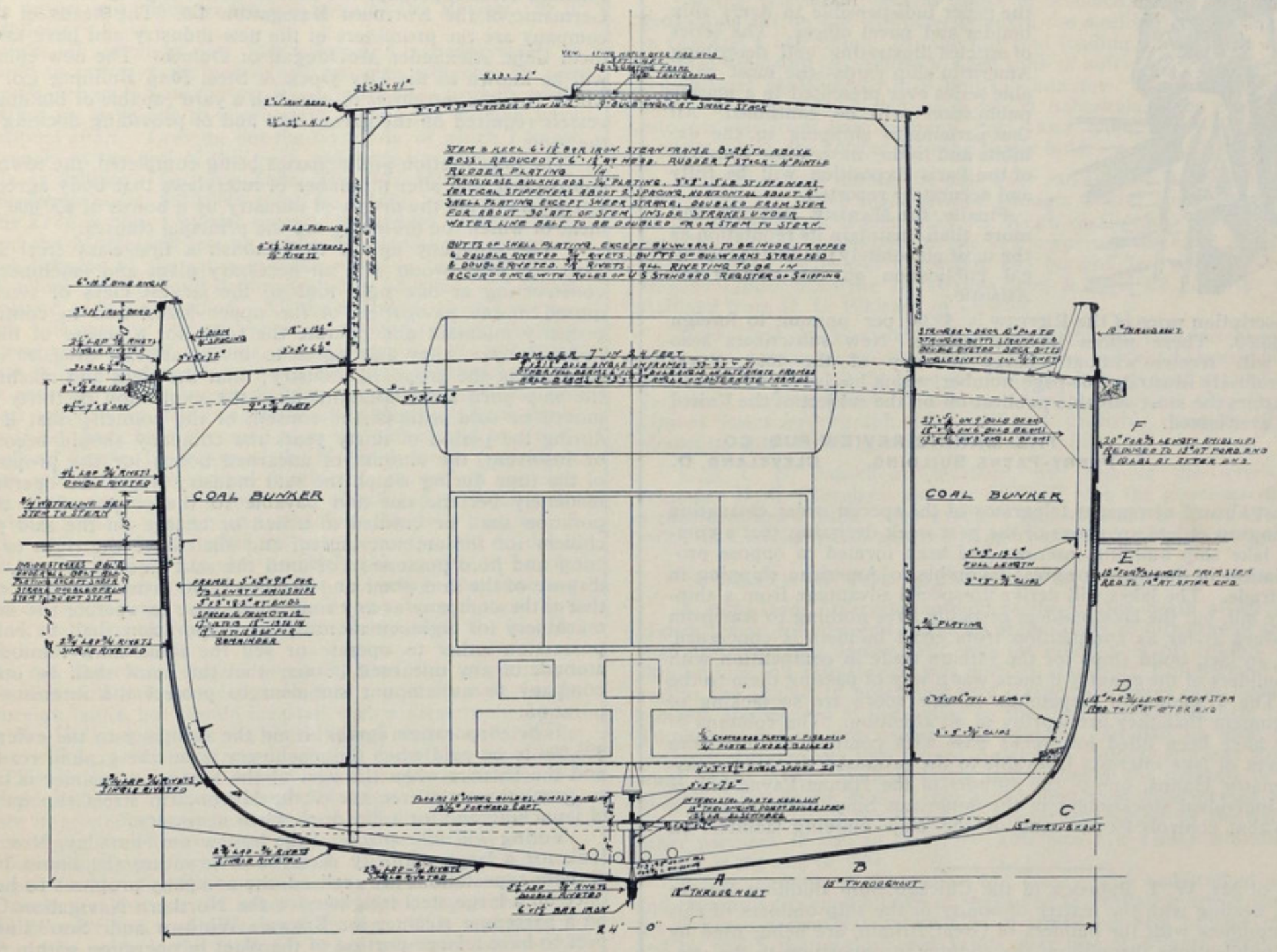
Under ordinary circumstances of war with a first-class maritime nation our ships would have been embarrassed for want of coal. It is not considered that this report is a proper place for an extended argument in favor of establishing coal depots or stations. Attention, however, may here be called to the difficulties encountered by Admiral Cervera in supplying his fleet with coal. As Spain had landed possessions in the West Indies it may be said that a United States fleet must, if called upon to act at any point across the Atlantic, encounter even greater difficulties than were found by Admiral Cervera. As a matter of fact it may be stated, without fear of contradiction, that at present it would be impossible for a United States fleet to carry on operations during a war anywhere about the coast of Europe, Africa, a large portion of Asia and South America for want of coal. This country has assumed a position of great responsibility in connection with the maintenance of sovereignty of territory of the South American republics against any aggression on the part of any European nation, and yet there is not a single port where coal or supplies may be obtained in time of war by a United States ship anywhere on the eastern or western coast of South America. In the West Indies and the Pacific ocean we are now somewhat better off. It is of paramount importance, however, to establish a coal depot on each side of the isthmus of Panama near the termini of the Isthmian canal."

In regard to the general condition of coal depots Admiral Bradford says that the piers and slips of the depot at Honolulu are to be completed by contract in March next and that the depot at Pago Pago, Samoa, will soon be established. It is recommended that a coaling station be established at Yokohama under an old lease from the Japanese government and that facilities be provided for the storing of 10,000 tons of coal at Guam. Improvements are urged for the coaling stations at Manila. Admiral Bradford says that a coaling station should be established near the Yucatan passage, the Windward passage, Mona passage and Virgin passage, all being important strategic points. "Foreign coaling stations," he says, "which do not carry with them sovereign rights are of very little value. The ordinary coaling stations for commercial ships are sufficient as a rule for war vessels during times of peace. During war, however, the government must rely upon its own resources."

The chief of the bureau of equipment also recommends an increase and the improvement of domestic coaling stations. "At the beginning of the late war," he says, "with the exception of a shed at Key West with a capacity of 3,000 tons, there were no accommodations at any of the navy yards or naval stations of our own coast for the receipt or storage of coal or means for rapid handling of the same in accordance with the best commercial practice of the day. The navy had relied entirely upon coal dealers to supply coal to ships in the stream, by means of lighters, as required. The bureau was much embarrassed during the war for means to satisfy the demands of commanding officers for rapid coaling and it was frequently impossible to coal ships which were patroling our coasts in a reasonable time. Merchant ships are generally coaled alongside of their piers while men of war are without such facilities. Liberal appropriations were made during the last congress for remedying these defects. These appropriations have only been available since July and in most cases but little progress has been made upon the work. When completed there will be facilities for storing and handling coal rapidly at the navy yard, Portsmouth, N. H.; navy yard, Boston, Massachusetts; naval station, New London, Conn.; navy yard, New York; navy yard, League island, Pa.; naval station, Port Royal, S. C., and navy yard, Pensacola, Fla.

"There is much need for a coaling station in the vicinity of Frenchman's bay, coast of Maine, and in Narragansett bay, Rhode Island. No good coal for steaming purposes is mined near the Pacific coast. For this reason it is transported there from Great Britain, Australia, New Zealand or the Atlantic coast. Owing to the uncertainties due to the transportation of any merchandise for such a long distance by water, the uncertain demand for use on board naval vessels, and to the fluctuating prices in freights, it is evident that there should be large storage facilities at naval stations and other places of rendezvous for naval ships on this coast. The navy has relied upon local dealers who proved during the late war to be totally unable to supply the demand at reasonable rates. The temptation to take advantage of the necessities of the government at such a time are very great, but should by no means be permitted. Besides most of the coal imported into San Francisco is not sufficiently good for naval use. The only remedy is to keep on hand large amounts of coal in store. There should be in San Francisco a storage capacity for at least 100,000 tons.

"It is recommended that congress be asked to authorize retired officers of the navy to be placed in charge of naval coal depots. Many of them, while not physically qualified to undergo the hardships and exposure incident to sea service, are qualified for this duty. They are better adapted for it, owing to their professional knowledge, than civilians; being commissioned officers they are subject to a court martial for any malfeasance in office and the government would receive some return for the compensation paid them. Many retired officers would be glad to perform this duty for the difference between retired pay and duty pay. It should be stipulated that when performing this duty they should receive the same rate of pay as those on the active list."



SECTIONAL PLAN OF THE NEW FIREBOAT FOR THE CITY OF BUFFALO.

SHIP BUILDING ON THE PACIFIC COAST.

George W. Dickey, manager of the Union Iron Works of San Francisco, during a speech at the banquet of the Society of Naval Architects and Marine Engineers in New York last week, made a noteworthy prediction in regard to the future development of ship building on the Pacific coast.

"About twenty-five years ago," said Mr. Dickey, "I said to some friends of mine: 'It won't be many years before we are building iron ships on the Pacific coast.' My friend, Irving Scott, heard of this some time later and he is said to have made this comment: 'I always knew Dickey could tell a mighty good story, but this time he has gone way beyond the bounds of reason. Why, it's absurd.'

"Now, I'll make another prediction," continued Mr. Dickey. "I believe that within a few years we shall be building steel ships on the Pacific coast, with nearly 200 feet of length for each thousand miles they have to travel; that is, ships at least 1,000 feet long. Trans-Atlantic ships have about reached these proportions, and I believe Pacific ships will soon do the same thing."

THE MARINE REVIEW IN 1900

FROM all quarters of the globe the eyes of ship builders and ship owners are being turned upon America. This arousal of interest began months ago. Every day of 1900 will see it grow more intense. One of the straws that indicate the trend of the wind is the large increase in the foreign subscription list of the MARINE REVIEW. The study of American methods is universal, and from Italy to the Orient ship builders are purchasing American machinery. The MARINE REVIEW will give special attention to every phase of this subject throughout the closing year of the century. It will not only tell just what the people in the industry beyond the seas wish to know, but it will give accurate information regarding the use that is made of American tools in foreign yards, and will present for its readers in the United States the fullest details regarding all that is new in foreign practice.

The MARINE REVIEW is the first trade or class publication in America to maintain a regularly conducted Washington bureau. The work of this important adjunct will be broadened and enlarged, and will of itself make the paper indispensible to every ship builder and naval officer. The series of articles illustrating and describing American ship yards—the most valuable series ever presented in a marine publication—will be continued. All that pertains to shipping in the exhibits and in the navigation congress of the Paris Exposition will be fully and accurately reported.

Finally, the MARINE REVIEW will more than maintain its reputation as the most elaborately illustrated technical publication on this side of the Atlantic.

The subscription price of the REVIEW is $2.00 per annum; to foreign countries, $3.50. These prices include postage. New subscribers who request it will receive without charge a copy of the 1899 Naval Edition, a profusely illustrated 60-page number, which has been pronounced in many quarters the most valuable publication on the subject of the United States Navy ever issued.

THE MARINE REVIEW PUB. CO.
PERRY-PAYNE BUILDING, CLEVELAND, O.

The most absurd newspaper telegrams of the special order emanating from Washington of late are those of the past week declaring that a combination of lake ship building interests had been formed to oppose proposed legislation in the next congress favorable to American shipping in the foreign trade. The lakes will derive no special advantage from a shipping subsidy bill, but the lake builders certainly have nothing to fear from such a measure as far as competition from coast builders is concerned. They could, in fact, build ships for the foreign trade in competition with any of the builders of the country if there was a way of passing them to the seaboard. The Washington dispatches on this score are so lacking of sensible argument that they are worthy of no attention. The columns of the Review have been filled for weeks past with communications from representatives of lake interests favorable to the proposed shipping measure, and Senator Hanna, one of the authors of the Hanna-Payne bill, is the largest individual stockholder in the American Ship Building Co., a corporation that controls 90 per cent of the ship building facilities on the lakes.

Letters of Mr. W. I. Babcock of the Chicago Ship Building Co., to the Review, dealing with the matter of ability of the ship builders of this country to compete with the builders of Great Britain, are being used by "free ship" publications throughout the country in opposition to the proposed legislation in the next congress favorable to American shipping in the foreign trade. Mr. Babcock is certainly misunderstood. He knows too much about ship building to claim that the existing seaboard ship yards can build trans-Atlantic vessels as cheaply as they can be built abroad. Anyone reading his articles carefully will see that he did not claim any such thing, but merely pointed out that this would be the result of the ideal conditions he describes, when the coast has a sufficient number of modern ship yards and orders are numerous enough to keep them steadily and fully employed. These are hardly the existing conditions, nor are they likely to be unless some beneficent national legislation makes a merchant marine on the oceans practically possible.

The North German Lloyd steamer Kaiser Wilhelm der Grosse a few days since established a new transatlantic record by lowering her own time from Cherbourg to New York from 5 days, 17 hours and 38 minutes to 5 days 17 hours and 27 minutes. The daily runs were 388, 548, 552, 535, 552 and 475 miles, making a total of 3,050 nautical miles. The vessel made an average speed of 22.19 knots. Besides holding the westward record the Kaiser Wilhelm also holds the eastward record to Plymouth, having made the voyage in 5 days, 15 hours and 10 minutes, with an hourly average of 22.61 knots. The same liner holds the record from New York to Southampton on a performance of 5 days 17 hours and 8 minutes.

A dispatch from Norfolk, Va., states that the first of a number of shipments of Pocahontas coal for the Japanese navy was made a few days ago when the British collier Needle took on 5,000 tons consigned to Nagasaki. Large orders for Pocahontas coal have also been received of late from South Africa

COLLINGWOOD SHIP YARD.

PROPOSED ENLARGEMENT OF THE CANADIAN WORKS SO AS TO PROVIDE FOR THE CONSTRUCTION OF STEEL SHIPS.

Collingwood, Ont., Nov. 29—Spl. Cor.—The steady growth of the trade between the east and the west, and the new era in Canadian shipping opened up by the government deepening the St. Lawrence canals to a uniform depth of 14 feet, has aroused the Canadian shipping men to the necessity of increasing their tonnage. During the past two years the trade has grown very rapidly, but the climax was reached this fall when the abundant harvest of the northwest was ready to be moved to the seaboard. Owing to the lack of Canadian tonnage, the government, after consideration of the representations made by the Winnipeg Corn Exchange and other important mercantile bodies, suspended the Canadian coasting laws and permitted American bottoms to participate in the coasting trade.

This action hurried shipping men to a decision to improve the condition of affairs on this side of the line by building the required tonnage. With this end in view the proposition to establish a large and fully equipped steel ship building yard at Collingwood was brought forward. The Collingwood Dry Dock & Wrecking Co., of which Messrs. Thos. and J. J. Long, Chas. Cameron and Capt. P. M. Campbell are the principal stockholders, has been carrying on an extensive wooden ship building yard for some years, during which they have turned out a number of splendid vessels, perhaps the best known being the steamers Majestic and Germanic of the Northern Navigation Co. The heads of the dry dock company are the promoters of the new industry and have associated with them Capt. Alexander McDougall of Duluth. The new company, which will be known as the Dry Dock & Steel Ship Building Co. of Collingwood, Limited, proposes to establish a yard capable of building the largest vessels required on the great lakes and of providing docking facilities for the same.

The organization preliminaries being completed, the town council was approached, and after a number of interviews that body agreed to ask the ratepayers to aid the proposed industry by a bonus of $50,000 on an agreement of which the following are the principal clauses:

"The company agrees to establish a first-class steel ship building yard at Collingwood with all necessary plant and machinery capable of constructing at one time four of the largest class of steel vessels required in the navigation of the upper lakes, and to continuously and properly maintain and operate the same for a period of thirty years at Collingwood. They also agree to invest at least $100,000 in the establishment of the proposed industry; that the plant and machinery used in the ship yard shall not until after the expiration of thirty years be removed or sold without the consent of the council; that if at any time during the period of thirty years the company should become bankrupt or insolvent, the amount of unearned bonus for the proportionate part of the time during which the said industry was to be operated shall immediately become due and payable to the corporation; that the corporation shall be entitled to a lien or charge on the said plant or machinery for the amount thereof and shall have the right to immediately enter and hold possession of until the said amount is paid, or to sell or dispose of the said plant and machinery in order to realize on the same; that if the company at any time shall cease to operate the said plant and machinery for eighteen months, the corporation shall be entitled to take possession either to operate or sell the same until reimbursed for the amount of any unearned bonus; that the plant shall be insured by the company to an amount sufficient to protect the interests of the corporation.

"The corporation agrees to aid the company to the extent of $50,000, $25,000 to be paid when the machinery is on the ground ready to operate and the balance when the keel of the first steel steamer is laid, and also to grant them the free use of the Hurontario street slip for the purpose of launching and for a dry dock when necessary."

Voting will take place on the by-law on Thursday, Nov. 30, the outlook for a large majority in favor of granting the bonus being bright. If these expectations are realized, the company proposes to begin work at once on a large steel freighter for the Northern Navigation Co., and also on a passenger steamer for Brown's Windsor and "Soo" line. They expect to have a large portion of the plant in operation within three months and the complete equipment here at the expiration of six months.

Although the largest shareholder, Capt. McDougall, does not intend to make this his permanent home, he will spend some time here at the outset, assisting in the purchasing of the necessary tools and machinery, and will probably remain until the work on the first steamer is well under way. He will continue to make his home in Duluth, to which city he is wedded by many ties.

PRICES OF IRON ORE—COAL FREIGHTS.

Producers of non-Bessemer iron ores of the Lake Superior region met in Cleveland, Tuesday, and practically agreed upon a base price of $4.25 a ton, as against $2 a year ago. Another meeting is to be held on Monday next, but it is not probable that this price will be changed, as a result of anything that may occur in the meantime. The Bessemer association has held a preliminary meeting and it can be announced positively that the base price for the old-range Bessemers will be $5.50 a ton, as against $2.90 a year ago. For some mysterious reason the management of the Biwabic mine, one of the finest Bessemer properties of the Mesabi, has sold large quantities of ore for next year at $4.25.. This action has, however, had no effect on the producers of other leading Mesabi ores, who will undoubtedly demand $5.00 to $5.25 a ton.

An item of interest in lake freights is the establishment of a 50-cent contract rate for carrying soft coal from Ohio ports to the head of Lake Superior next season. Enough has been done to warrant the belief that probably a couple of million tons of coal will be covered before the opening of another season of navigation at that figure. Fifty cents a ton on coal up the lakes and $1.25 a ton on ore down are certainly very profitable rates.

INTEREST IN THE HOLLAND.

NEWSPAPER REPORTS ARE TO THE EFFECT THAT FOREIGN GOVERNMENTS ARE AFTER AMERICA'S LATEST TYPE OF TORPEDO BOAT—ENGINEER LOWE'S REMARKABLE REPORT.

Reports of the success attending recent trials at Peconic bay of the Holland submarine torpedo boat, accounts of which were contained in the last two issues of the Review, seem to have induced a wonderful revival of interest in the craft. If newspaper reports are to be believed, the matter has been taken up by both the British and French naval attaches at Washington, and the French representative has gone so far as to recommend that his government secure the exclusive right to the use of the invention. The owners of the boat have determined to take the craft to Washington in order to give before the naval committee and other members of congress a practical demonstration of its workings. Arrangements have been made to start within a few days in tow of the steam yacht Josephine, and the Holland will be subjected to still further tests in the Potomac. Naval Constructor Francis T. Bowles of the Brooklyn navy yard, who first recommended to former Secretary of the Navy William C. Whitney the value of submarine attack, is quoted in a New York paper as saying that he is still convinced of the soundness of the theories which he then held. The very remarkable supplementary report submitted in connection with the regular report of the trial board by Capt. John Lowe, U. S. N., recorder of the board, has also attracted a great deal of attention. Short reference to this report was made in the last issue of the Review. It is in substance as follows:

"We need, right off and right now, fifty submarine torpedo vessels in Long island sound to preserve the peace and to give potency to our diplomacy. The French in this matter are much more alive to their needs than we are. What we have left to a private company the French have taken up as a national affair. Leaving out the Gymnote, of which I know but little, the French, at the end of this year, will have spent money and produced vessels as follows: Gustave Zede, $386,181; Morse, $166,483; Narval and class, seven boats, $910,000; total, $1,462,664. It so happens, however, that the Zede is only a partial success, newspaper accounts notwithstanding, and the Morse still less so, while the Narval and class will be abject failures because of the same mistake made in our Plunger—a notable mistake, which the Holland demonstrated in advance, and which mistake, I understand, is to be rectified. All the mistakes which have befallen the French will pass by our government, notwithstanding the fact that, instead of one and one-half millions, our government has not spent one cent, nor has it bestowed anything more than scant encouragement upon the private company which has spent large amounts of money. Besides the mistakes saved, very many essential difficulties have been overcome, which could not have been dreamed of at the outset, and as a consequence the Holland people, by means of the Holland, are in possession of ripe experience, which the government should possess, and no one else.

"Among the facts stated in the first part of my report I have described the Holland torpedo station and sketched the daily routine. I might observe that this is precisely what the government would do did it possess a station of the kind. It is also precisely the routine to be observed by a torpedo boat at sea, lying in wait for an enemy—that is to say while motionless or in cruising trim the batteries can be recharged and the air tanks filled, ready for the approach of an enemy, until the fuel for the gas engine is nearly exhausted.

"It seems to me, therefore, quite a necessity that this government should not allow this skill and knowledge to pass out of its own hands from native to foreign lands, but should forestall such a catastrophe by at once purchasing the Holland and putting the Holland people under some ban whereby they will be prevented from disclosing secrets to the disadvantage of the United States. How keenly foreign governments are alive to the Holland is shown by the presence of foreign officers upon her. Concerning future improvements to be made in the Holland and her successors, I confine myself to one example to show how much this point is a matter of opinion and not yet of knowledge. The Holland thus far has only one torpedo tube. On the one hand some advocate two such tubes, and give good reasons; on the other hand others argue that one tube only should be provided, and give good reason. This and several other alterations can be made in the Holland, either now or at any other time, if so desired by the government. I desire to add my own opinion as to what the future policy of the navy department should be after inaugurating a submarine service. Instead of doing too much with one vessel, each one should be a distinct vessel of its kind, and not have combined two or more kinds in one vessel. Thus there should be submarine torpedo boats, submarine gunboats, submarine observation and dispatch boats, submarine countermines and submarine channel draggers, etc., each kind complete in itself, but not combining more than one office. The object I have in mind is to keep the boats down to small dimensions for the sake of handiness, and to keep each boat as roomy and as habitable as possible for the sake of the crew. It must be remembered also that this class of vessel cannot possibly have the comforts of a roomy vessel. For example, there is no room for bodily exercise and recreation. There can only be limited cooking facilities. They must, therefore, always be attached to some base, either on shore or afloat, and then, when sent on service, the vessel and the crew must be considered analogous to an army scouting party; they must carry food in their haversacks and water in their canteens. For sleep, they will always be better off than soldiers are, because they will always have a dry and a warm blanket and sufficient relief to get sufficient rest. When the fuel for the engines is exhausted then food should be exhausted, and the vessel should return to base, or the base to the boat, for relief and replenishment."

The report of the trial board is made up largely of technical details and is far more conservative in tone than that of Engineer Lowe. Among the statements made, however, is the following: "Throughout the double run over the mile, the conning tower was closed, and the air within the vessel was quite fresh and pure. While on the course and submerged it was very noticeable that the only disturbance of the water was due to the distance poles at each end of the boat. On one or two occasions when the vessel dipped forward and the propeller came near the surface the wake of the boat was quite noticeable, although the vessel itself was not in sight."

Appropriations made by congress some time ago for the construction of two additional submarine torpedo boats will become available as soon as the navy department declares itself satisfied as to design. This is looked for at an early date, and in all probability the new boats will be built at Lewis Nixon's Crescent Ship Yard at Elizabethport, N. J. It is understood that the work of altering in conformity with the Holland design the machinery in the submarine torpedo boat Plunger, now building for the United States government at the yard of the Columbian Iron Works, Baltimore, will be proceeded with as soon as authority can be secured from the navy department.

ALONG THE GREAT LAKES.

Lieut. Geo. N. Hayward is the naval officer now in charge of the branch hydrographic office in Cleveland. Lieut. Hayward comes of salt water stock, his father having been Commander G. W. Hayward, who died some years ago in Alexandria, Egypt. He was graduated from the naval academy in 1888 and in the eleven years of his service has been berthed in the Boston, Pensacola, San Francisco, Baltimore, Philadelphia, Baltimore again, and in the Monadnock, being but recently detached from sea duty and assigned to shore duty. He was with Dewey at Manila.

At the Wisconsin Central docks in Ashland, a few days ago, 5,000 gross tons of iron ore was placed aboard the steel barge Geo. E. Hartnell in two and a half hours. At the fast coal loading plant of the Baltimore & Ohio company in Sandusky 4,500 tons of soft coal was placed aboard the steamer McWilliams in 9 hours 5 minutes. The Sandusky plant is similar to that of M. A. Hanna & Co. at Ashtabula. The coal is dumped into pockets from bottom-dump cars, and from the pockets to 5-ton buckets which are hoisted into the ship's hold.

Sales of vessels during the past week include the steel steamers Parks Foster and Ira Owen from Messrs. Clough, Foster and others of Elyria, O., to A. McVittie of Detroit, J. G. Keith of Chicago, and others. The vessels are to be turned over to the new owners at the close of navigation. Capt. James Corrigan of Cleveland, has bought two more vessels—the steamer Quito, from the Tonawanda Iron & Steel Co., and the schooner Ashland from D. C. Whitney of Detroit.

Capt. C. P. Perkins of the U. S. S. Michigan, who has been making surveys in various parts of the lakes, says the passage between Mackinaw and Round island is only good for 19 feet. It is all foul ground, he says, and there may be boulders with even less than 19 feet over them. The United States hydrograph office will very probably issue shortly a supplemental chart covering this particular locality.

Capt. C. E. Dahlke of Cleveland, will remove the wreck of the schooner H. G. Cleveland under a contract with the government and for a consideration of $485. The wreck of this schooner is about W. N. W. 4 miles off Cleveland crib and is a dangerous obstruction to navigation.

DEATH OF THE FOUNDER OF WHITE STAR LINE.

A cable from Liverpool announces the sudden death of Mr. Thomas Henry Ismay, founder and chairman of the board of directors of the White Star line. Thomas Ismay, who was the eldest son of Joseph Ismay, a ship builder and ship owner, was born at Maryport, Cumberland, in 1837, and at the age of 16 proceeded to Liverpool to enter into business life. He was apprenticed at the outset to the then well-known firm of Imrie, Tomlinson & Co., ship owners and brokers. In 1867 he took over the business of the White Star line of Australian clippers and was soon afterward joined by Mr. William Imrie, son of one of the partners in the firm of Imrie, Tomlinson & Co. The two young men then formed the business of Ismay, Imrie & Co., which strengthened later by the addition of other partners, is still in existence, although Mr. Ismay himself retired from it at the end of 1891.

Before the close of the sixties, Mr. Ismay, who had studied with care and closeness the possibilities of improved transatlantic travel, organized the Oceanic Steam Navigation Co., of which his firm became managers and by which the world-famed White Star line of Atlantic steamers was started. The Oceanic, the first steamer of the line, was launched in 1871 and admittedly revolutionized the Atlantic type of passenger steamers. She was followed by other vessels, each an improvement upon its predecessor, until culmination has come in the magnificent new Oceanic, the largest vessel ever constructed. Mr. Ismay continued until his death as chairman of the White Star line. In 1887, his jubilee year, Mr. Ismay started with a gift of $100,000 (since augmented by further donations of $200,000) a pension fund for aged Liverpool seamen, under the operation of which over 100 old mariners are each receiving a pension of $100 per year. Two of Mr. Ismay's sons are managers of the White Star line.

It is announced from Seattle that the Pacific Coast Steamship Co., which has for years had practically a monopoly of the coastwise steamer trade from Alaska to San Diego, is now controlled by James J. Hill, president of the Great Northern Ry. Goodall, Perkins & Co. of San Francisco, formerly owned the Pacific coast steamship lines, but sold the control fifteen years ago, obtaining at the time a contract as general agents of the system, which will expire Jan. 1, 1900. The announcement of sale is based on statements made by United States Senator George C. Perkins of Goodall, Perkins & Co., who is to retire not only from the shipping firm but also from the steamship company Jan. 1 next.

The Berlin Iron Bridge Co., East Berlin, Conn., has just shipped twenty-seven carloads of structural material to the Paris exposition. The material will form the steel framework of a machine shop to be used exclusively by the American exhibitors of iron and wood-working machinery. The building will be 343 feet in length and 77 feet in width.

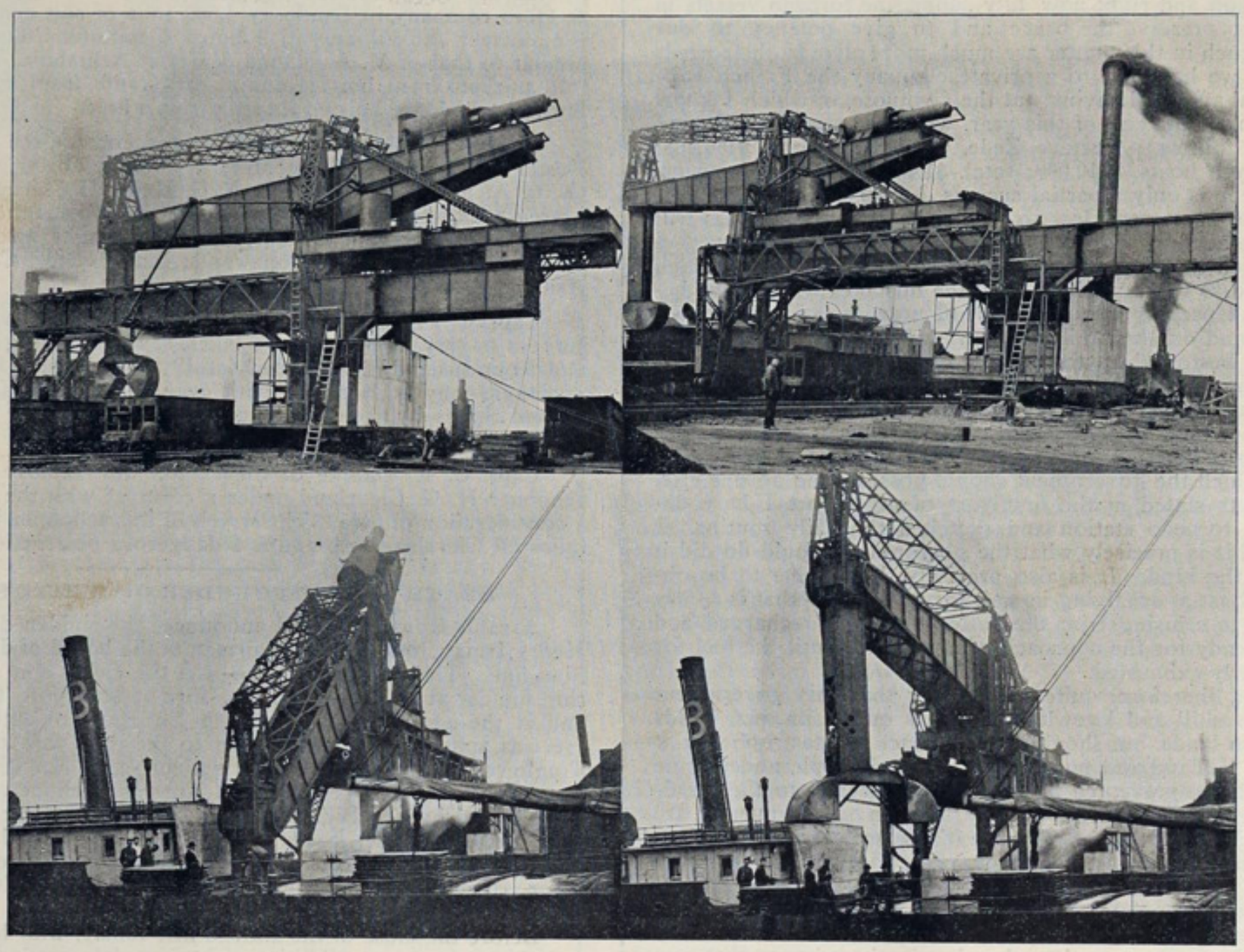
HULETT ORE UNLOADING MACHINE.

On the Carnegie ore docks at Conneaut during the coming fall and winter opportunity will be afforded for thorough trials of the Hulett ore unloading machine, as several cargoes arriving late in the season will be held in vessels for that purpose. This machine, several times referred to in these columns, is designed to displace great numbers of laborers engaged in shoveling ore into buckets from the holds of vessels under the present method of unloading. One of the wonders of the world is the great system of appliances used in handling ore and coal on the lakes. Cargoes of 6,000 to 7,000 gross tons of ore are loaded in three or four hours by means of the elevated docks with pockets and chutes that are used at shipping ports in the upper lake region, and these same cargoes are unloaded at Lake Erie ports in ten to twenty hours, by the employment of large forces of men and the use of hoisting and conveying machinery operating through twelve to fourteen large hatches in a single ship, but this latter operation involves so much labor and delay in comparison with the rapid method of loading the ore, that the effort to perfect an automatic device of the kind herewith illustrated must eventually prove successful.

The Hulett machine is, of course, still in the experimental stage, but the pictures presented herewith will show that no expense is being spared in its development. Four views of the machine with walking beam and clam-shell bucket in different positions, over vessel and over cars, are shown in the engraving.

Omit ing details in view of the experimental stage of the entire apparatus, it may be said in brief that the machine consists of a heavy steel structure with principal members of plate girder construction, traveling lengthwise of the dock. Traversing the top of the main structure and moving at right angles to the dock is a heavy walking beam, at the outer end of which is a depending leg carrying a 10-ton clam-shell bucket. This leg is always kept in a vertical position by means of a parallel motion, as shown in one of the pictures. The bucket end of the walking beam is counter balanced by means of the hydraulic accumulator located at the opposite end. The whole machine is moved lengthwise of the dock by means of a pair of engines geared to the wheels on each main leg of the structure, while all other movements on the machine are accomplished by hydraulic power through suitable cylinders. All the operating levers are grouped in the depending leg, so that the operator travels with the machine, his position being directly above the bucket.

It is expected that a single machine of this kind will take 10 tons of ore at a lift from modern boats having hatches not less than 10 feet 6 inches long by 7 feet 9 inches wide, and at the rate of 250 tons per hour. The bucket discharges into cars on either one of two tracks at the front of the dock, or into a hopper at the back of the dock when it is desired to stock the ore. This hopper may be drawn back and dumped into a storage bin or into a tram car designed to be drawn back on the conveyor bridge. Hydraulic power for all movements, except traveling along the dock, is provided at a pressure of 700 pounds by means of a duplex compound pressure pump and steam accumulator. The machine is manufactured by the Webster, Camp & Lane Machine Co. of Akron, O.



HULETT AUTOMATIC ORE UNLOADER ON THE CARNEGIE DOCKS AT CONNEAUT, O.—MANUFACTURED BY THE WEBSTER, CAMP & LANE MACHINE CO., AKRON, O.

A cablegram from Manila to the navy department announces that the race between the cruisers Brooklyn, Newark and New Orleans was won by the Newark.

DISTRIBUTION OF NEW CRUISERS.

The six 3,500-ton cruisers, for which contracts were awarded on the 27th inst. by the navy department, and which are all to be constructed in accordance with department designs have thus been distributed among the builders named. The Galveston to the Wm. R. Trigg Co. at Richmond, for $1,027,000, to be built in twenty-four months; the Chattanooga to Lewis Nixon, at Elizabethport, N. J., at $1,039,966, to be built in thirty months; the Cleveland to the Bath Iron Works of Maine at $1,041,650, in thirty months; the Tacoma to the Union Works of San Francisco, for $1,041,900, to be built in twenty-seven months; the Des Moines to the Fore River Engine Co. of Braintree, Mass., at $1,065,000, to be built in thirty months; the Denver to Neafie & Levy of Philadelphia at $1,080,000, to be built in thirty months. While rated as 15-knot boats, Chief Constructor Hichborn is satisfied that these cruisers will make no less than 17 knots if necessary. In fact the Neafie & Levy company has undertaken to guarantee that their vessel, though built on the department's designs, can make 17 knots at a minimum.

VIEWS ON THE IRON TRADE.

Andrew Carnegie, in an interview of ten days ago, went on record as predicting that this year, favorable as it has been to the iron and steel trade, will find a counterpart and even a superior in 1900, and gives reasons for this opinion which, from the standpoint of an iron manufacturer, seem unassailable. Other leading manufacturers are credited with similar views in apparently expecting that the demand for steel for general purposes, leaving out that growing out of railroad necessities, will be of a particularly profitable nature. Supporting this view of the case, it is to be recalled that if recent reports of arrested consumption, due either to advanced prices or to inability to manufacture in sufficient volume, are to be credited, there exists in the iron trade a good-sized volume of what might be called supporting orders which will be placeable at the first sign of a recession in values. An example of this latter character is found in dispatches from Chicago, where large orders for steel rails, estimated to aggregate 150,000 tons, will be placed if the price of that product drops $2 per ton. Late interviews with authorities in iron and steel circles would seem to show that American manufacturers have not abandoned the idea that there exists a profitable market abroad for still larger quantities of American iron and steel, and support is given to this latter view by reports of the placing of a large order for steel rails by the Japanese railways, the amount being given at 20,000 tons.

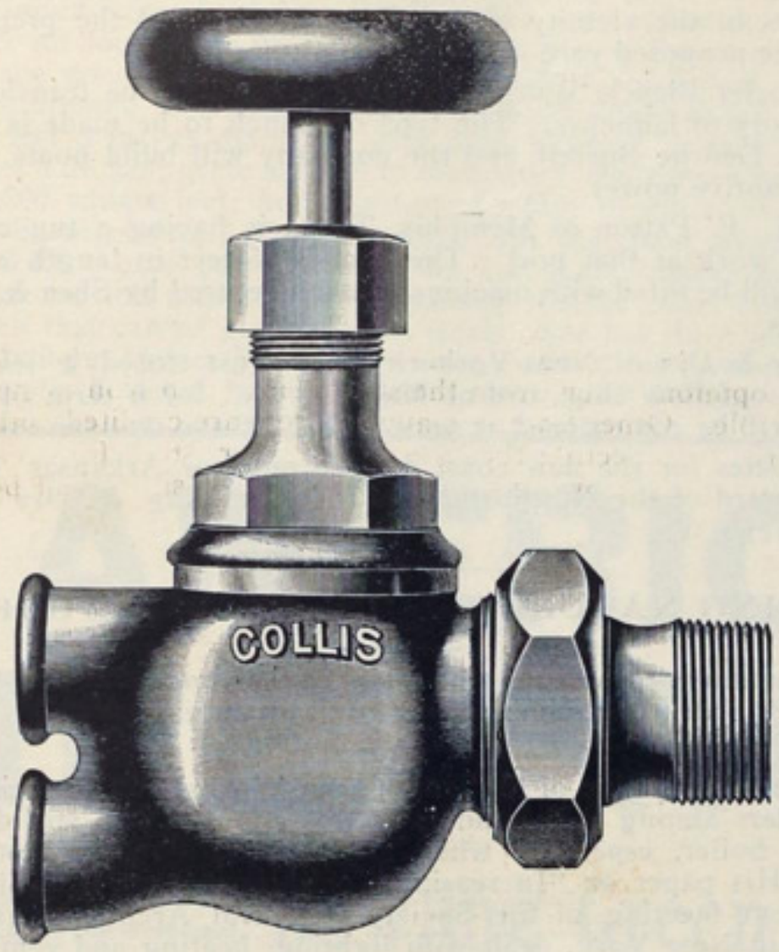
General Passenger Agent W. F. Herman of the Cleveland & Buffalo Transit Co. has just issued his annual announcement of the closing of navigation as far as his line is concerned—Nov. 30—and as usual it is a highly artistic production. The pictorial design is entitled "Gathering Up for the Season." A stylish young woman is gathering in her arms the four steamers of the C. & B. line.

The United States torpedo boat Talbot, which was some time ago equipped for the burning of petroleum fuel, has successfully passed all the regulation tests and has been ordered to join the north Atlantic squadron for an extended sea trial under practical conditions.

CIRCULATING VALVE.

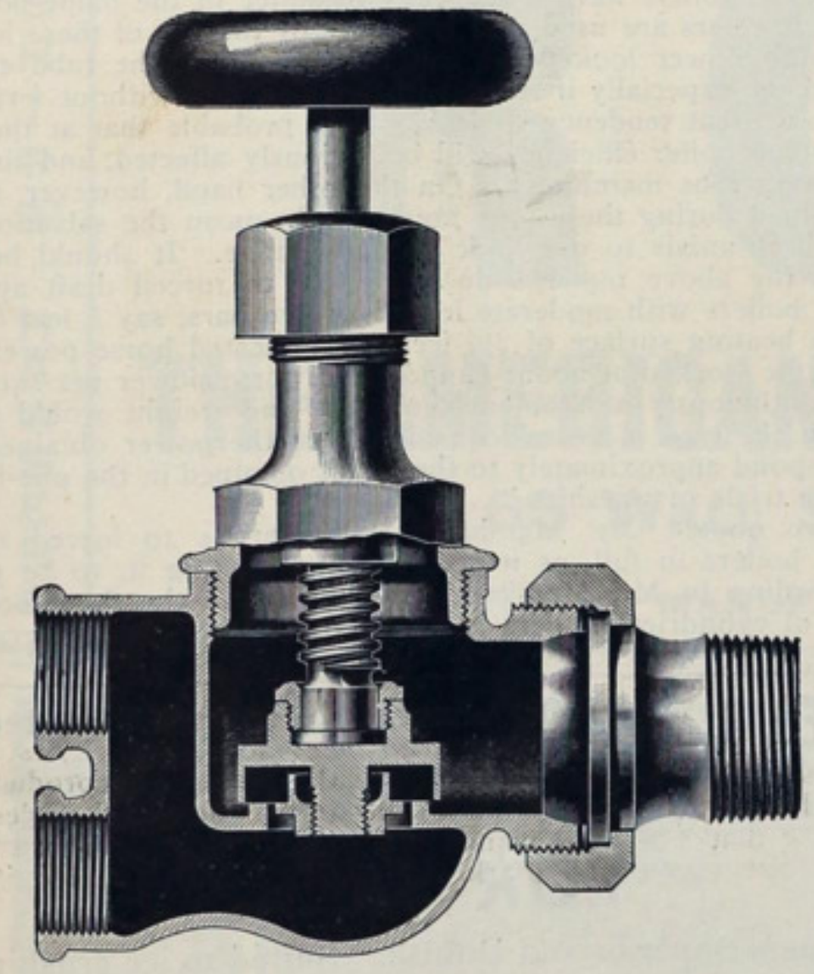
The Collis circulating valve for radiators, heating coils, etc., which is illustrated herewith, is manufactured by Jenkins Bros. of New York. The manufacturers say of it:

"This valve is not a new or untried device but has long been experimented with by the ablest men in the heating business. When attached to a radiator there is a perfect circulation of dry steam at all times up to the seat of the valve. Only one valve is required for a radiator and the circulation will be active and positive, whether the valve is open, partly open, or closed. Heating surfaces can be warmed much more quickly and



effectively when steam is turned on at the radiator, and the usual hammer which takes place when steam is turned on is prevented. Radiator connections can be neatly and mechanically run above the floor and attached to the valve without making them unsightly.

"With this valve there is a complete circulation in the apparatus when radiators are disconnected, and they can be disconnected and reconnected without shutting down the whole system. This will be found very convenient when using radiators for temporary heating in new structures of any kind. The valve can be adapted to any of the automatic heat regulating systems by removing the regular bonnet and substituting the diaphragm bonnet and trimmings of the regulating system that may be used. It is made in the following sizes: 1¼-inch to radiator ¾" x ¾" steam



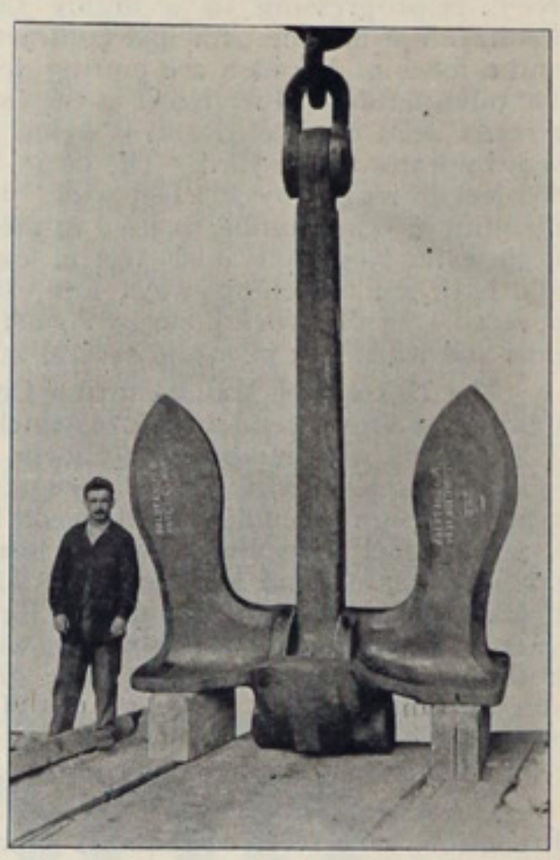
and return, which will supply radiators or coils up to 60 square feet of surface; 1½-inch to radiator 1"x1" steam and return, which will supply radiators or coils up to 100 square feet of surface; 2-inch to radiator 1¼"x1¼" steam and return, which will supply radiators or coils over 100 square feet of surface.

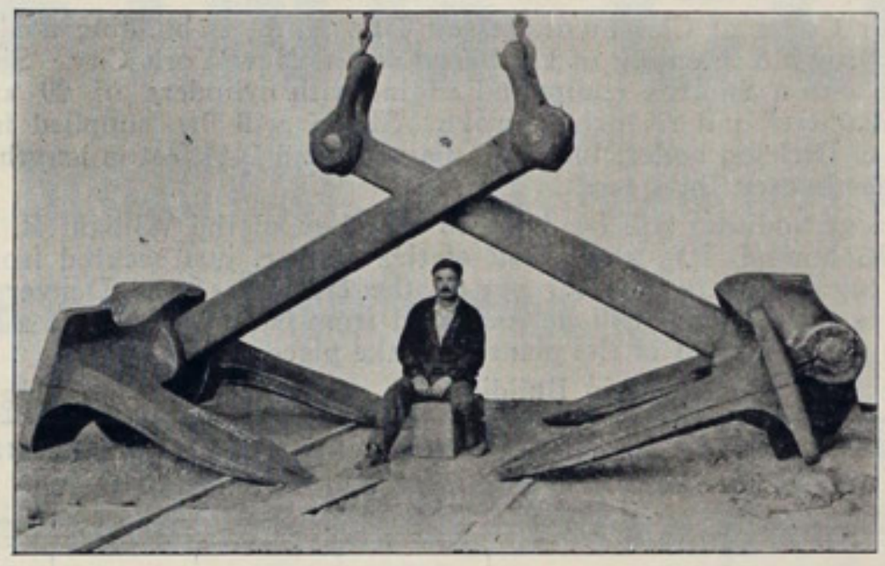
"These valves are made of the best steam metal, are extra heavy, contain all the improvements and are manufactured, tested and inspected in the same careful manner as our regular radiator valve."

Thanksgiving day rates via the Nickel Plate road are available Nov. 29 and 30, good returning until Dec. 1, inclusive, at one and one-third fare for the round trip within a radius of 150 miles. A Peerless trio of daily express trains. 166, Nov. 30

STOCKLESS ANCHORS OF 14,000 POUNDS EACH.

The largest stockless anchors ever made in this country are shown in two illustrations printed herewith. They are of the Baldt patent type, made by the Baldt Stockless Anchor Co. of Chester, Pa., and their weight is over 14,000 pounds each. They were made for the United States transport Thomas, which is regarded as the largest and finest transport in the world. The Thomas is now on her way to Manila with troops and with provisions for the American army in the Philippines. The manufacture of stockless anchors in this country has been growing apace with the development of our shipping. On the great lakes, for instance, the sales of stockless anchors for new ships now under construction will aggregate full 250,000 pounds. It is not, of course, necessary to carry on the lakes anchors as large as those used in ocean-going vessels, but the anchor equipment of the modern steel freight steamer or tow barge in the Lake Superior trade is by no means a small item. All these vessels carry two anchors forward of 4,000 to 5,000 pounds each and one aft of 2,000 pounds. The largest vessels of the Rockefeller fleet





of ore carriers have two anchors of the 2,000-pound type aft, in addition to the big anchors forward. Five years ago there were no stockless anchors on the great lakes. Now there is no other type of anchor used.

NEW NORTH GERMAN LLOYD STEAMERS.

The steamer Rhein, building for the North German Lloyd Co., was recently launched at Hamburg. She is the first of three vessels of similar type under construction for the same line. The other vessels, which are under way at Hamburg and Geestemunde respectively, will be christened the Main and Neckar. All three are twin-screw ships and each is fitted for 140 first-cabin, 150 second-cabin and 2,600 steerage passengers. Each vessel has a double bottom throughout and is fitted with eleven watertight bulkheads and also with bilge keels. Dimensions—the same in all three vessels—are 520 feet length, 58 feet beam and 40 feet depth; displacement 17,700 tons, and 10,200 gross tons register. Each vessel is to carry a crew of 140 men and when in service will maintain a speed of 13½ knots.

All the cabins on these vessels, even including the second cabins, are amidships and the spaces for the 'tween deck passengers are in the poop and in both 'tween decks and under the upper deck. Unusual facilities are provided for the rapid loading and discharging of cargo, there being no less than 29 slings rigged on the four masts, which are served by fifteen steam winches. Eight hatchways are provided. Each boat is fitted with two quadruple expansion engines capable of developing 5,000 indicated horse power. All three vessels will go into commission early in the new year and will be placed in service on the company's New York-Bremen route.

Mr. A. W. Belcher, master mechanic of the Ulster & Delaware Railroad Co., is evidently impressed with the future of the Marine Review. He has just renewed his subscription for five years, paying in advance. He will probably be the gainer by this order, as further enlargement of the Review must result in a higher subscription charge.

The Phenix Metallic Packing Co. of Chicago, has just heard of the results of a trial of one of their lubricator pumps on a steam hammer at the Western Electric Co.'s works. The test was in every way satisfactory, and as a result of it the electric company has placed additional orders.

Ohio and Indiana game law—From Nov. 9 to Dec. 1, inclusive, excursion tickets for parties of three or more traveling together on one ticket at one fare for the round trip will be sold to points in western Ohio and Indiana on the Nickel Plate road. The immense quantities of small game along the line of the Nickel Plate road affords rare enjoyment to the sportsman. 168, Nov. 30

THE BUSY SHIP YARDS.

Work at the new plant of the New York Ship Building Co., Camden, N. J., is progressing in a highly satisfactory manner. Armstrong & Printzenhoff are the principal contractors. Four pile driving machines and a force of 150 men are putting down into the bed of the river about 140 piles per day. Pier No. 1 at the extreme northern end of the yard has already been completed and is being used for the unloading of material sent by water to the yard. The large ships' ways are well along. Each is 450 feet in length by 100 feet wide. Over 2,800 piles and a considerable quantity of sawed timber is used in the building of each of these ways. A deep water basin fully 1,000 feet in length will adjoin the launching ways and both the launching ways and deep water basin will be partially covered. In the work done by Armstrong & Printzenhoff, 20,000 yellow pine and white oak piles and several million feet of lumber will be used.

The Herreshoff Manufacturing Co. of Bristol, R. I., is at work on a number of steam tenders, all of which are being built from one design. The tenders are building for Edwin D. Morgan, August Belmont and William K. Vanderbilt, all of New York city. The boats are of a new type, in design not unlike the torpedo boat Stilletto, and each is 81 feet in length, 72 feet water line, 11½ feet beam and of composite construction—double planking and steel frames. The freeboard will be 6 feet. These boats will be of whaleback design forward and under this will be the quarters for the crew. The saloon will be below deck and there will be nothing standing over 3 feet above the deck. The owners wished twin screws, but upon the advice of the Herreshoffs single screw boats were agreed upon. They are to have a guaranteed speed of 20 miles on their trial trips and an average cruising capacity of 17 miles.

The Roach Ship Yard, Chester, Pa., and the Union Iron Works, San Francisco, have received requests from Flint, Dearborn & Co. that work be hurried on the vessels now building for that firm. It is hoped that the vessels may be delivered in February or March, instead of in June as stipulated by the contracts. Three of the 8,000 tons capacity steamers, the American, Hawaiian and Oregonian, are building at the Roach yard and the fourth, the Californian, at San Francisco.

Peter Colon of Claremont, Jersey City, N. J., is building a 111-foot tug for Brown & Fleming of 129 Broad street, New York City. She will be fitted with a Sullivan compound engine with cylinders of 20 and 40 inches diameter and 28 inches stroke. Steam will be supplied from a Watkin & Dickson boiler, 10 feet in diameter and 14½ feet in length, built by Heipershausen Bros.

A large addition will be made to the plant of the William R. Trigg Co. at Richmond, Va., as a result of the contract just secured from the United States government for one of the cruisers of the Denver class. The force of workmen will be increased from 600 to 1,600 and a corresponding enlargement of the plant will take place.

The New England Ship Building Co. of Bath, Me., is building three barges of 3,000 tons dead weight capacity each, for the Coastwise Steamship Co., and three barges of 1,700 tons capacity each for the B line. They have also under order a schooner of 1,800 tons capacity and another schooner to be built for owners as yet not announced.

The Kennebec Steamboat Co. is to build a large steel twin-screw coasting steamboat of 15 knots speed and with 200 to 250 staterooms, to replace the wooden steamer Lincoln, which has been sold to Florida parties. The Lincoln is a small twin-screw steamboat of good speed, and the selling price is reported to be $145,000.

The project for the establishment of a new ship yard at New Orleans is not dead, as many persons suppose. Options have been secured on several sites in the vicinity of the Crescent city and the preparation of plans for the proposed yard is going steadily forward.

The Lozier Bicycle Works at Toledo, O., are to be transformed into a manufactory of launches. The type of launch to be made is the invention of Mr. George Burrell, and the company will build boats with every variety of motive power.

Capt. L. E. Patton of Memphis, Tenn., is having a tug constructed for harbor work at that port. The boat is 75 feet in length and 16 feet beam and will be fitted with machinery manufactured by Shea & McCarthy of Memphis.

McKay & Dix of New York city, have just closed a lease of the William Longfellow ship yard at Machias, Me., for a term of five years and work will be commenced at once on a 1,200-ton wooden vessel.

Keel plates for the new coast defense monitor Arkansas have been laid at the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of Nov. 28. 1899.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	49⅛	50	49	49
American Steel & Wire, Pfd.....	95½	95½	95	95
Federal Steel	61¾	62⅜	61¼	61½
Federal Steel, Pfd.....	81¾	82⅜	81⅝	81⅝
National Steel	48	49¼	48	48⅝
National Steel, Pfd.....	95⅜	95⅜	94⅞	94⅞
American Tin Plate	34½	34½	34¼	34¼
American Tin Plate, Pfd.....	.....	.....	.....	.....
American Steel Hoop.....	47⅝	48⅜	47½	47¾
American Steel Hoop, Pfd.....	85½	85½	85¼	85¼
Republic Iron & Steel	25⅛	26⅜	25⅛	26
Republic Iron & Steel, Pfd	71	71¼	71	71

DROP FORGINGS TO ORDER

STANDARD

Wrenches, Hoist Hooks, Sockets, Eye Bolts, Shafting Collars, Machine Handles, Thumb Screws and Nuts, Swivels, &c., &c.

KEYSTONE OPEN LINKS.

Send for Catalogue and Discounts.

1886.

SPECIAL

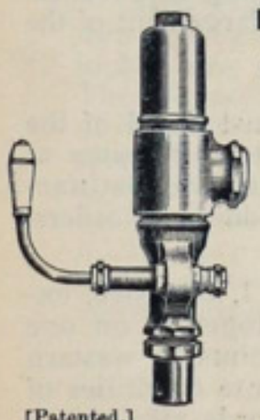
FORGINGS OF ALL KINDS.

Send Model or Drawing and Get our Prices.

May Reduce Present Cost.

KEYSTONE DROP FORGE CO., 19th and Clearfield Sts. PHILADELPHIA, PA.

THE KENNEY FLUSHOMETER



[Patented.]

FOR FLUSHING WATER-CLOSETS.

THE BEST SYSTEM EVER INVENTED FOR USE ON STEAM VESSELS.

NO CUP LEATHERS OR SPRINGS.

Owners and Constructors of Steamships. Yachts and Steamboats have found it indispensable.

Showing application of Flushometer.

Used by the U. S. War and Navy Departments—Transports Grant, Sheridan, Burnside, Terry, Hooker, Thomas, Sedgewick, Meade, Crook, McClellan, Sherman. Also Albany Day Line Steamers, and others.

THE KENNEY COMPANY,

Catalogue? 72 to 74 Trinity Place, NEW YORK.

FORCING NATURE TO OUR WAY OF WORKING.

A FEW INTERESTING PARAGRAPHS FROM GEO. W. DICKIE, SHIP BUILDER OF THE PACIFIC COAST, ON THE BOILER QUESTION.

Mr. Geo. W. Dickie of the Union Iron Works, San Francisco, is one of the leaders among ship builders of this country who still defends the cylindrical boiler, especially when attended by Howden hot draft appliances. His paper on "Increasing Complications in War Ships," read at the recent meeting of the Society of Naval Architects and Marine Engineers in New York, dealt with lighting, heating and ventilating apparatus, electric signals and various other auxiliaries. It had nothing to do with boilers. But at the risk of departing from the subject of the paper Mr. Dickie included a few interesting paragraphs on the boiler question.

"In the present stage of water tube boiler development," he said, "it appears to be quite impossible to get the most simple and well-known facts in regard to cylindrical boilers honestly considered in naval circles. For instance, in one of the best papers I have read, comparing two types of water tube boilers with the cylindrical boiler, by Mr. F. T. Marshall, before the last meeting of the Institution of Naval Architects, he says, in regard to forced draft:

"'In the case of the cylindrical boilers, a four hours' run is probably as long as these boilers could be worked at the maximum forced draft power. These boilers have a tendency to suffer in the flame-box seams when long fire bars are used, and it is only by the use of these long bars that the high power looked for can be obtained. The tube ends also get choked up, especially if fitted with ferrules, and without ferrules the tubes have a great tendency to leak. It is probable that at the end of four hours the boiler efficiency will be seriously affected, and the power could no longer be maintained. On the other hand, however, the high speed obtained during these four hours might mean the salvation of the ship, and it is unfair to overlook this advantage. It should be understood that the above remarks do not apply to forced draft applied to cylindrical boilers with moderate length of fire bars, say 5 feet 6 inches, and with a heating surface of 2¼ feet per indicated horse power. Such boilers can be worked at about 17 indicated horse power per square foot of grate continuously at sea, but their size and weight would preclude their use in the type of vessel considered, as the power obtained would only correspond approximately to the result obtained in the one-half-inch air-pressure trials of warships.'

"I have qnoted Mr. Marshall's statement as to forced draft on cylindrical boilers in full, as it seems, when reading it, to be perfectly fair. According to Mr. Marshall, the difficulty in the flame-boxes and tube ends of cylindrical boilers is owing to the use of long grate bars.

CAPT. GEO. A. SIMPSON, Expert Compass Adjuster, 19 YEARS EXPERIENCE.

Yearly Contracts Solicited. Nautical Instruments Repaired.

OLD 'PHONE No. 319 SAULT STE. MARIE, MICH.

FOR SALE.

Steamers Superior and Duluth. Suited to ice crushing purposes. Good excursion boats—1,000 to 1,500 capacity each. Euclid Beach Park Co., Cleveland, O. Dec. 7.

WANTED.

One second-hand Compound Condensing Fore-and-Aft Steamboat Engine, cylinders 14 x 28 x 14; or one second-hand Double Steeple Compound Condensing Engine, cylinders 9 x 18 x 14; or approximating those sizes; also one Double Simple Engine, cylinders about 7 x 9. Address A. C. Wade, Jamestown, N. Y. Nov. 30.

and long grate bars are necessary to get the power in the space required. Now I had always thought that the difficulty with the cylindrical boiler was due to the closed fire-room system of forced draft, due to the inrush of cold air to the flame-boxes when the fire doors were opened, and, perhaps, a practice of pitching the tubes a little too close. Mr. Marshall admits that cylindrical boilers can be worked continuously under forced draft, if the grates are short, at about 17 horse power per square foot of grate. He says nothing of that being under an entirely different system of forced draft, which may have more to do with the continuous working than length of grate. Perhaps the best way to get at the actual facts is to compare the power of boilers working under the short and the long bar system, as Mr. Marshall puts it.

"The United States battleship Wisconsin is expected to develop 10,000 horse power for four hours under forced draft, closed fire-room principle, and when she does that it will be with the best Cardiff coal obtainable, and selected firemen to handle it. She has eight single-ended cylindrical boilers, 15 feet 5 inches diameter, with four furnaces in each; length of grates, 6 feet 0 inches; grate surface in all boilers, 680 square feet; heating surface, 21,200 square feet; horse power per foot of grate, 14.7; heating surface per horse power, 2.12 square feet. The merchant steamer Queen has made 3,400 horse power every day for years under forced draft, Howden system, and uses the most ordinary Pacific coast coal, and the smallest crew that can be got to do the work. She has three single-ended cylindrical boilers, 14 feet 5 inches diameter, with three furnaces in each; length of grate, 5 feet 0 inches; grate surface in all boilers, 162 square feet; heating surface, 7,326 square feet; horse power per foot of grate, 21; heating surface per horse power, 2.125 square feet. Weight of Wisconsin's boilers, including water, per horse power on four hours' trial, 122.1 pounds; weight of Queen's boilers, including water, per horse power on continuous work, 137 pounds.

"On the battleship and the merchant ship I have compared, it does not appear that Mr. Marshall's statement holds good. The heating surface in each case per horse power is practically the same. The horse power per foot of grate is much greater for the merchant ship, while the weight is slightly in favor of the battleship boiler. I have taken the boilers in each case alone, without uptakes and smoke-pipes, which are much heavier in the battleship. The merchant-ship boilers are not of such high grade material, and are consequently heavier for the pressure carried. The battleship boilers have their ends curved above the water line, to save the weight of stays, which is considered too expensive for merchant-ship work. The same design on the Queen's boilers would result in the weight per horse power being no greater than that of the Wisconsin. I have taken this opportunity to place this matter as clearly as I can before the society. We will, no doubt, go on for some time making various forms of water tube boilers, until the conviction is forced upon engineers that a boiler tube with the pressure inside, ready to tear it open when a weak point develops, is not so safe a thing to generate steam with as a boiler tube with the pressure outside, that prevents the possibility of a rupture in the wall of the tube. In the meantime we will apply whatever skill we have to force nature to our way of working."

AMERICAN WOOD FIRE-PROOFING CO.

GUY PHELPS DODGE, President.
J. S. H. CLARK, Vice-President.
Bowling Green Bldg., 11 Broadway, N. Y. Tel. No. 1338 Broad

Make all kinds of wood ABSOLUTELY NON-FLAMMABLE, at their works at Newark, N. J.

Our treatment has been accepted and is being used by different bureaus of the United States Navy and the General Electric Co., having passed the required tests.

A SPECIALTY: TOWING LINES AND SHIPS' HAWSERS

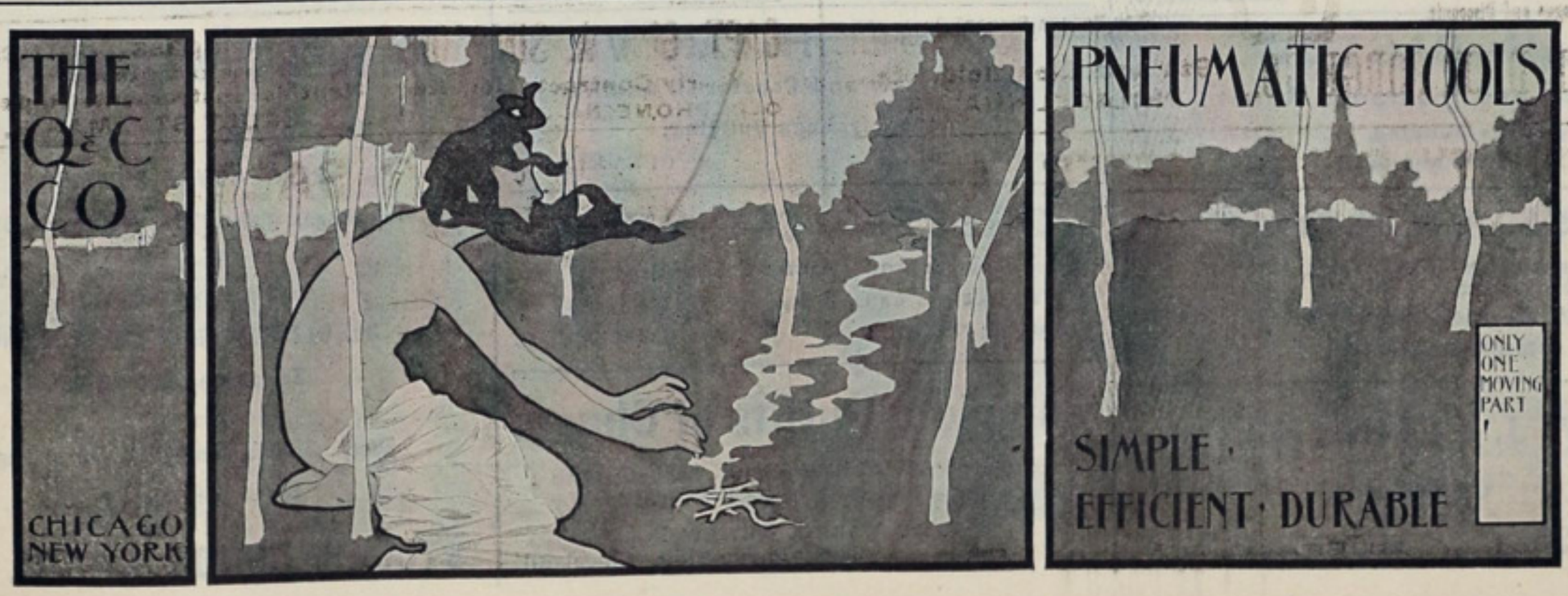
ROPE

THE AMERICAN MANUFACTURING CO.

65 WALL STREET, NEW YORK.

THE LARGEST MANUFACTURERS OF FIBER IN THE WORLD.

A SPECIALTY: 4-STRAND PLUMBAGO HEART HOISTING ROPE FOR CARGO FALLS



VESSEL AND INSURANCE AGENTS.

C. W. ELPHICKE & CO.
Vessel and Insurance Agents,

Room 10, No. 6 Sherman St.,

C. W. ELPHICKE.
CALVIN CARR. CHICAGO, ILL.

Long Distance Telephone, Harrison 1194.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.

MITCHELL & CO.
Vessel and Insurance Agents,

508, 509 & 510 Perry-Payne Building, Cleveland, O.

Office Telephone 767. Residence, John Mitchell, Doan 341.
John F. Wedow, 158 L. Alfred Mitchell, Doan 197 J.

W. C. RICHARDSON,
VESSEL AND MARINE INSURANCE AGENT,

Office Telephone 338. Residence Telephone 2938.

606 and 607 Perry-Payne Bldg., Cleveland, O.

BROWN & CO.
J. J. H. BROWN.
J. B. RODGERS.
EDWARD SMITH.

Vessel and Insurance Agents,

202 Main Street, Buffalo, N. Y.

H. J. PAULY,
General Ship Broker,

59 Chamber of Commerce, MILWAUKEE, WIS.

Telephone Main 369.

J. G. KEITH. D. SULLIVAN.

J. G. KEITH & CO.
Vessel and Insurance Agents,

138-139 Rialto Building, CHICAGO.

Long Distance Telephone, Harrison, 1339.

JOHN B HALL. HARRY B. ROOT.

HALL & ROOT,
Vessel Agents,

No. 55 Main Street,

Telephone Seneca 892. BUFFALO, N. Y.

ALEX. McDOUGALL. Telephone 89.
W. A. THOMPSON, JR. Cable Address: "Maculuth."

ALEX. McDOUGALL & CO.,
DULUTH, MINN.

AGENTS FOR

Lake, River, Canal and Ocean Transportation, and Marine Insurance.

M. M. DRAKE. G. W. MAYTHAM.

DRAKE & MAYTHAM,
VESSEL AGENTS.

202 Main Street, BUFFALO, N. Y.

Telephone, Seneca 1660.

HUTCHINSON & CO.
Vessel and Insurance Agents.

Office Telephone, Main 2453.
Residence C. L. Hutchinson, Doan 19J.

C. L. HUTCHINSON.
W. H. McGEAN. 412 Perry-Payne Building, CLEVELAND, O.

J. H. BARTOW,
Vessel and Insurance Agent

514-516 Perry-Payne Building, Cleveland, O.

TELEPHONE 717.

THOS. WILSON, Managing Owner
Wilson's Transit Line.

Gen Forwarder, Freight and Vessel Agent,

CLEVELAND, O.

W. J. CONNERS,
OFFICES—
BUFFALO,
CHICAGO,
MILWAUKEE,
GLADSTONE

Contractor,

BUFFALO, N. Y.

VESSEL AND INSURANCE AGENTS.

SAMUEL HOLMES,
Steamship Offices,

For Selling, Chartering and Building all classes Steam Vessels.

Steam Vessel Circulars. Weekly Freight Circulars.

Morris Building, 66 & 68 Broad Street, NEW YORK.

MILLER, BULL & KNOWLTON,
Vessel Owners and Steamship Agents,

32 Broadway, NEW YORK.

Agents New York & Porto Rico Steamship Company.

JOHN J. BOLAND,
Vessel and Insurance Agent,

182 MAIN STREET, BUFFALO, N. Y.

Telephone Seneca 115.

JAMES A. MYERS,
Insurance and Vessel Agent

Room 514, Royal Insurance Bldg., CHICAGO.

Telephone Main 1924.

W. A. HAWGOOD. J. W. MOORE.

HAWGOOD & MOORE,
Vessel and Insurance Agents,

Residence Phone, Doan 446—W. A. Hawgood.
Long Distance Tel. 2395.

608 Perry-Payne Building, CLEVELAND, O.

C. R. JONES & CO.
VESSEL AGENTS,

Fire and Marine Insurance,

501, 502 & 503 Perry-Payne Building, Cleveland, O.

PROCTORS IN ADMIRALTY.

HOYT, DUSTIN & KELLEY,
LAWYERS and PROCTORS IN ADMIRALTY,

Offices, 702 Western Reserve Bldg., Cleveland, O.

White, Johnson, McCaslin & Cannon,
ATTORNEYS AT LAW and PROCTORS IN ADMIRALTY,

Blackstone Bldg., Cleveland O.

HARVEY D. GOULDER,
Lawyer and Proctor in Admiralty,

CLEVELAND, O.

ALBERT J. GILCHRIST,
PROCTOR IN ADMIRALTY,

604 Perry-Payne Building, CLEVELAND, O.

SAMUEL H. CROWL,
Attorney at Law and Proctor in Admiralty,

426 Cuyahoga Building,

Phone Main 2040. CLEVELAND.

ORESTES C. PINNEY,
Lawyer and Proctor in Admiralty,

Rooms 316 and 317 Perry-Payne Building,

Telephone Main 2585. CLEVELAND, O.

Complete Outfits of Charts
for new vessels, bound and backed with linen, so as to last for years, are furnished by

THE MARINE REVIEW PUB. CO.,
Perry-Payne Bldg., Cleveland.

PROFESSIONAL.

W. J. WOOD,
Naval Architect, Ship Surveyor,

Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs Surveys damaged property and estimates cost of repairs.

Vessels designed—Twin S. S. Virginia, Steam Yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

Complete plans furnished for Steel Composite or Wooden Vessels.

Office on Goodrich Dock, foot of Michigan Ave., CHICAGO, ILL.

ROBERT W. HUNT & CO.
BUREAU OF INSPECTION, TESTS AND CONSULTATION.

1121 THE ROOKERY, CHICAGO. MONGH. BANK BLDG., PITTSBURGH. 71 BROADWAY, NEW YORK.

Inspectors of Shipbuilding Material and Machinery. Inspectors of all Materials. Duty Tests of Engines and Boilers. Physical and Chemical Laboratories.

HORACE SEE,
Consulting Engineer and Naval Architect,

1 Broadway, NEW YORK.

GUSTAV HILLMANN,
NAVAL ARCHITECT.

Designer of all classes of VESSELS.

470 Greene Ave., near Norstrand, Brooklyn, N. Y.

JOSEPH R. OLDHAM,
Engineer and Naval Architect.

Designs Steam Vessels, Marine Engines and Boilers, and Superintends their Construction or Repairs.

814 Perry-Payne Building, CLEVELAND, O.

Telephone, Doan 440, J.

ROBERT CURR,
CONSULTING SHIP BUILDER and MARINE SURVEYOR,

56 Wade Building, CLEVELAND, O.

Telephone Main 2844. Residence, 32 Malcom Street.

Residence Telephone, W. 628 Y.

AMBROSE V. POWELL, C.E.
Consulting Engineer.

SPECIALTIES:—Designing and Construction of DRY DOCKS, Harbor Works, Docks and Plants for Handling Coal and Ore.

Office, 615 Chamber of Commerce, CHICAGO, ILL.

PATENTS.

E. L. THURSTON. ALBERT H. BATES.

THURSTON & BATES,
Counselors at Law in Patent Causes and Solicitors of Patents,

1028 Society for Savings Bldg., CLEVELAND, O.

HERBERT WRIGHT & CO.,
No. 215, 216, 217, 218 and 219

PERRY-PAYNE BUILDING.

Telephones Main 2754, 2770 and 3541.

Up-town Office,

No. 811 NEW ENGLAND BUILDING.

Telephone Main 1273.

Every possible facility for conducting a brokerage business in

STOCKS, BONDS, GRAIN, ETC.

THE BERLIN IRON BRIDGE CO.,

Engineers. Architects and Builders of Steel Structures.

Office and Works **EAST BERLIN, CONN.**

AIR COMPRESSORS

Rock Drills, Coal Cutters, Air Lift Pump and Stone Channellers.

THE INGERSOLL-SERGEANT DRILL CO.,

CATALOGUES. Havemeyer Building, NEW YORK.

USERS OF GAS ENGINES

Who are having trouble in obtaining steady work from the igniters on their engines, should send at once for the pamphlet illustrating and describing our new igniter. It is

CHEAP! POSITIVE! DURABLE!

Uses either battery or magnets, as desired, and gives large spark of high temperature with small and weak currents, thereby adding greatly to the life of battery.

FITS ANY ENGINE!

Correspondence with makers of gas engines, launch builders and launch users is solicited, and will receive prompt attention.

COTTON & KUNZE,

185 Dearborn Street. CHICAGO, ILL.

LANE & DeGROOT,

METALLIC LIFE BOATS,

(Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers, Etc., approved by the U. S. Supervising Inspectors. Also Wood Boats of Every Description. Repairing of every kind promptly attended to.

Telephone Call 340-B, Greenpoint. 70 and 72 Kent St., BROOKLYN, NEW YORK.

THE

Swain Wrecking Co.

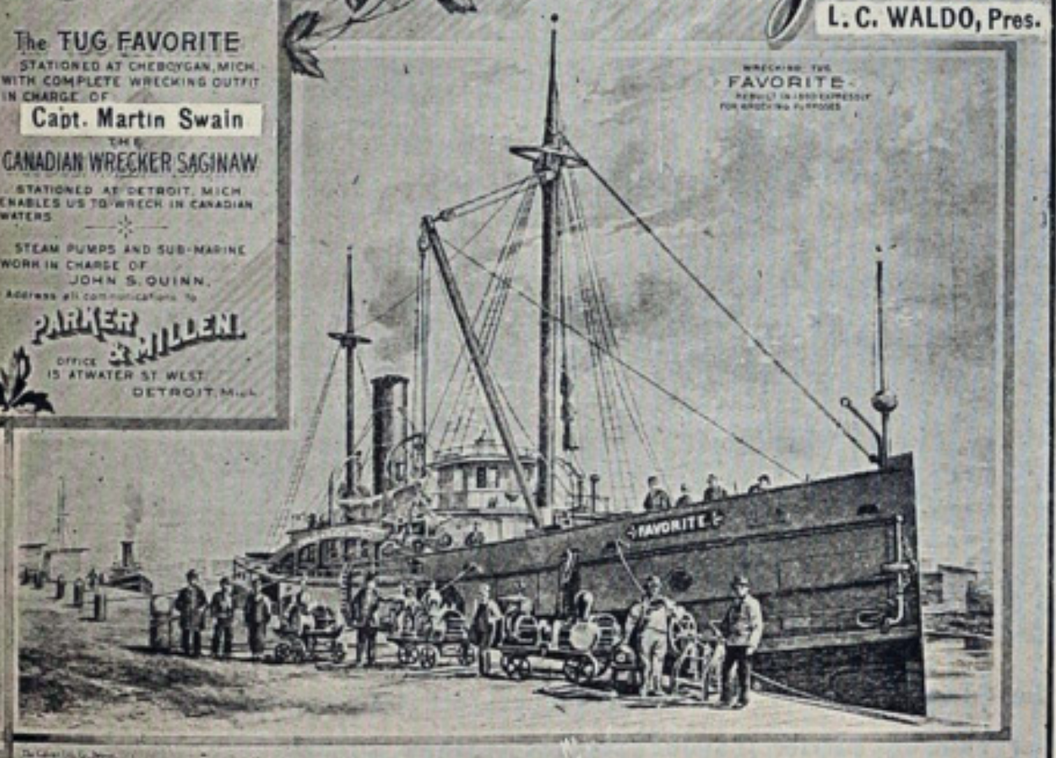
L. C. WALDO, Pres.

The TUG FAVORITE STATIONED AT CHEBOYGAN, MICH. WITH COMPLETE WRECKING OUTFIT IN CHARGE OF Capt. Martin Swain

THE CANADIAN WRECKER SAGINAW STATIONED AT DETROIT, MICH. ENABLES US TO WRECK IN CANADIAN WATERS

STEAM PUMPS AND SUB-MARINE WORK IN CHARGE OF JOHN S. QUINN.

Address all communications to PARKER & MILLEN, OFFICE 15 ATWATER ST. WEST DETROIT, Mich.



4 STEAM PUMPS, 10 JACKS, 3 HAWSERS.

1 COAL and ORE PUMP
2-12 INCH ROTARY
1-14 INCH WORTHINGTON

DIVING RIGS AND DIVERS ABOARD AT ALL TIMES

1899	December					1899
SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..				

10-100 TON JACKS
1-12 INCH HAWSER
1-10
1-9

Telegraph

Capt. MARTIN SWAIN, CHEBOYGAN, MICH.

TELEGRAPH

PARKER & MILLEN, DETROIT, MICH.

U. S. Engineer Office, Milwaukee, Wis., Nov. 14, 1899. Sealed proposals for building Crib Breakwater at Sheboygan Harbor, Wis., will be received here until 12 o'clock noon, standard time, Dec. 14, 1899, and then publicly opened. Information furnished on application. J. G. Warren, Capt., Engrs.

Dec. 7.

COAL

STANLEY B SMITH & CO.

OPERATING SMITH'S COAL DOCK POCKET FUELING AND LOW DOCK, DETROIT, MICH.

OFFICES: DETROIT MICH.

LORAIN, OHIO. OPERATING LORAIN COAL DOCK LAKE SHIPPERS OF STEAM COAL.

STEAMBOAT FUELING

COAL

Steamboat Fuel at Ashtabula,

LARGE SUPPLIES OF BEST QUALITY.

Lighter Carrying Different Grades at all Times.

Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

M. A. HANNA & CO., Miners and Shippers. Main Office, Perry-Payne Bldg., Cleveland

---

Pickands, Mather & Co.,

FUEL LIGHTERS AT BUFFALO, ERIE, ASHTABULA AND CLEVELAND.

At DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.

Best Quality PITTSBURGH COAL furnished at any time during Day or Night

Western Reserve Building, CLEVELAND, O.

ONE OF THESE BINDERS

that will hold 52 NUMBERS of the

MARINE REVIEW,

Will be mailed to any address or receipt of $1.

MARINE REVIEW...

Perry-Payne Bldg. CLEVELAND, O.

McMyler Manufacturing Company,

180 Columbus Street, CLEVELAND, O.

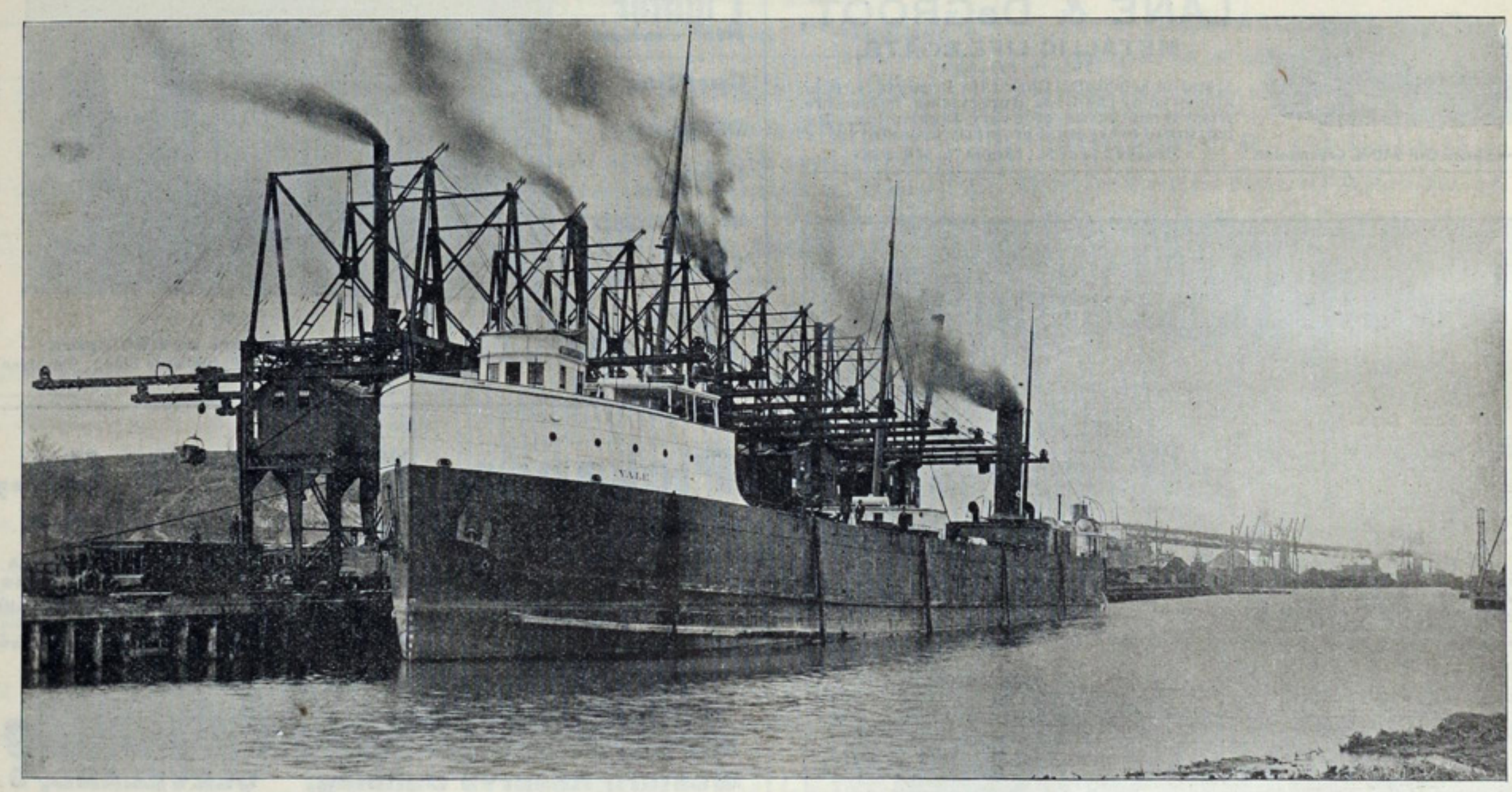
BUILDERS OF ALL KINDS OF

MACHINERY

FOR RAPID LOADING AND UNLOADING OF

Coal and Iron Ore.

HIGHEST DEVELOPMENT OF CAR DUMPING MACHINES.



Modern Ore Dock Equipment at Conneaut, the Carnegie Harbor on Lake Erie.

View from water side of McMyler direct ore unloaders—Steel Steamer Yale, ore carrier of about 5,000 tons capacity, at dock.

A PLANT AT CONNEAUT FOR DIRECT TRANSFER OF ORE FROM SHIPS TO CARS—CAPACITY 6,000 GROSS TONS PER DAY—IS OF OUR MANUFACTURE.

Plans and Estimates for Machinery suited to handling all kinds of Material.